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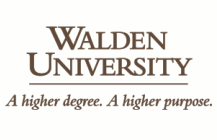

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The Effectiveness of READ 180 with Fourth-Grade African American Male Students

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Walden University

College of Education

This is to certify that the doctoral dissertation by

Twana White Williams

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Dr. Jason Ward, Committee Member, Education Faculty
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Walden University
2019

Abstract

The Effectiveness of READ 180 with Fourth-Grade African American Male Students

by

Twana White Williams

MA, Fayetteville State University, 2006

BS, Fayetteville State University, 2000

Proposal Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Education

Walden University

June 2019

Abstract

Fourth grade African American male students have the lowest rate of reading proficiency in the nation and are more likely to require remedial reading programs. Prior research suggested reading interventions that considered student ability, instructional practices, and curriculum rigor improved reading ability. The purpose of this quantitative study was to examine the influence of a remedial reading program, READ180, on 4th grade African American male students' reading comprehension as measured by 2 different standardized reading tests, TerraNova (TN) and Scholastic Reading Inventory (SRI) that are administered annually to all students. The theoretical framework was Vygotsky's theory of cognitive development. Research questions examined the differences in TN scores between students who received READ180 instruction compared to students who received traditional instruction as well as the effect on SRI scores of 7 students before and after participating in READ180. For data analysis, archival data were available for 2 years of SRI scores, but only a year of TN scores. An independent *t*-test for the TN scores between TN scores of READ180 students ($n = 7$) and traditionally instructed students ($n = 19$) showed no statistical difference ($p = .092$). A paired *t*-test indicated a significant ($p < .009$) increase in SRI posttest scores of READ180 students. The small number of subjects were under-powered and a result of available archival data, but the data met test assumptions. Implications for social change are that academically disenfranchised students may achieve reading proficiency when reading programs provide direct instruction that target, monitor, and intentionally support individualized learning needs.

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Dedication

This dissertation is dedicated first and foremost to my Lord and Savior Jesus Christ who kept me throughout this journey. To my wonderful husband Tommy, you have been my rock, anchor, and cheerleader and I thank you for all of your unwavering support. Alaina, Aleasha, Marley, and Mason thank you for giving me time and support to complete my assignments without feeling slighted or neglected. You all are and will forever be my inspiration. To my Mae and Gwen thank you for your love and opening your home to me. Nate, Joni, and Wanda thank you so much for keeping me encouraged, your words of affirmation, and motivation did not fall on deaf ears. Thank you to my family and friends for praying me through the process.

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Chapter 1: Introduction to the Study

The READ180 program is a computer-based reading program used as a Tier 2 Response to Intervention to aid classroom instruction. The READ180 program was designed to provide additional reading support to struggling readers commonly identified as students scoring below 25% on standardized assessments (READ 180, Next Generation , 2012). As a Tier 2 Response to Intervention (RtI) strategy, the READ180 program provides strategic research-based instruction to an at-risk population. In alignment with Tier 2 RtI, reading instruction occurs in a separate location, in small group and individual settings. Correspondingly, students are placed in READ180 as part of Sunnyside's community strategic plan to increase reading proficiency. The READ180 program services three groups of 15 students maximum. Students can participate in the program for a maximum of 2 years by the program guidelines (READ 180, Next Generation, 2012). As students exit the program, additional students totaling the same number are enrolled in the program.

The purpose of this quantitative casual comparative study was to examine the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the READ180 program. Additionally, the study was used to explore READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores. There was a need for this study because there was limited noncommercial research on READ180's effect on the reading ability of fourth-grade African American male students. Reading

interventions at the upper elementary level are pivotal points for remediating reading difficulties (Rasinski et al., 2017; Stevens, Walker, & Vaughn, 2016). The implication for social change in this study is students' academic progress may increase as schools evaluate the outcomes of implemented interventions as achievement enhancers for all students. In this chapter, I introduce the research questions, the problem statement, purpose statement, and background of the study. The theoretical framework guiding the study and the methodology that was used in the study are also presented. The section ends with a summarization of the chapter.

Background

Decades of educational reforms have not reversed African American male students' reading performance. Data trends from the National Assessment of Educational Progress illustrated a pattern of double-digit variance in reading ability between White male students and African American male students in fourth-grade (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). The average reading scores of the fourth-grade African American student populations has increased 14 points since the inception of standardized testing in 1991; yet remains below the basic reading level (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics [NCES], 2015). The basic reader is defined as having a limited grasp of reading, making simple inferences, and failing to draw rudimentary conclusions from grade level text (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). In contrast, a proficient reader is defined as one capable of sifting information to

draw conclusions and make judgments based on grade level information (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). Only 15% of African American males in fourth-grade are proficient readers compared to 43% of grade four Caucasian male students (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). The disproportionate ability in reading aptitude may be the result of ineffective reading instruction or reading interventions.

In this study, the focus was on reading interventions. specifically the READ180 program. The READ180 program was selected because there is limited peer-reviewed research on the program as a Tier 2 intervention with fourth-grade African American male students. The results of this study may affect social change by identifying a reading intervention that is effective with African American male students scoring below 25% on standardized assessments thereby increasing reading proficiency on the National Assessment of Educational Progress.

In 2015 the NAEP results indicated only 36% of the nation's fourth-grade student population read with proficiency (Freedson & Eastman, 2016). For fourth-grade African American males only, 18% were considered proficient readers (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics. (2015). Every Student Succeeds Act (ESSA) signed into legislation in 2015, reauthorized the Elementary and Secondary Education Act and addressed the achievement gap (U. S. Department of Education, Institute of Education Sciences, What Works Clearing House, 2016; Young, Winn, & Reedy, 2017). Like its predecessor, the Elementary and

Secondary Education Act, the goal of the legislation was eradicating race, gender, and ability differences in education by mandating environments and objectives that ensured all students received a quality education.

Proficient reading and reading with comprehension are essential skills that heavily influence short and long-term successes. Schools are tasked with producing students capable of reading, comprehending, and synthesizing a variety of texts and genres in multiple formats. For poor readers to accomplish this task, targeted, systematic and proven effective intervention must be given. Poor readers can only become proficient readers with practice, guidance, and support in reading (National Reading Panel, 2000). Numerous research studies suggested students who do not achieve reading proficiency in elementary school are usually unable to reverse the learning deficit (Jefferson, Grant, & Sander, 2016; Schiefele, Stutz, & Schaffner, 2016; Toste et al., 2014). Teaching approaches that use explicit instruction or direct instruction are considered valuable models for reading instruction (Denton, Fletcher, Taylor, Barth, & Vaughn, 2014; Mahdavi & Tensfeldt, 2013; Reutzel, Child, Jones, & Clark, 2014). In addition to direct instruction, the use of differentiated instruction also strengthens students' learning and reading development.

While differentiated instruction is traditionally provided by the teacher, advances in technology have equipped computer-aided instruction to use differentiation. Bahceci and Gurol (2016) discovered learning systems' use of differentiated instruction, in conjunction with traditional teaching, increased a group of first-grade students' achievement. The student's success was attributed to higher levels of student

engagement, and student motivation because of the learning application. As a learning system, READ180 differentiates instruction to build and strengthen students' prior knowledge allowing them to make connections to new concepts. Besides differentiation, scaffolding is also used to safeguard skill acquisition and appropriateness of application in novel situations.

The outcome of the study could improve African American male students' reading self-efficacy and academic achievement. To prepare for success in the 21st-century, fourth-grade African American male students must have the ability to read competently (Lee & Goldman, 2015). Reading on grade level is necessary to navigate the enriched cognitive process of 21st century skills which surpass traditional reading expectations (Geisinger, 2016; Lee & Goldman, 2015; Reynolds & Goodwin, 2016).

Problem Statement

Despite Sunnyside's, a pseudonym school system, use of the READ180 program, which was designed for struggling readers, 22% of fourth-grade African American male students throughout the district have not achieved basic reading capabilities (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, (2015). Peer-reviewed independent research of the READ180 program is limited. Most of the data on the READ180 program has been shepherded by Scholastic, the company that owns READ180 (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). Since the invention of READ180 in 1997, 33 total sources can be found that mention the program. The most recent peer-reviewed research on READ180 was conducted by Cheung and Slavin (2013)

and Parker, Holland, and Jones (2013), neither of the studies involved fourth-grade African American male students. Cheung and Slavin synthesis of 20 quantitative studies found READ180 educational technology had small positive effects with first through sixth-grade struggling readers.

Similarly, Parker et al., (2013) also found the program to have slight significance as an influencer on reading ability. The Texas Assessment of Knowledge and Skills test results revealed ninth graders in the READ180 program performed better in the study than those who participated in the Voyager program (Parker et al., 2013). In conclusion, READ 180 has shown to positively influence reading, but, a paucity of research on the program indicated a gap in the research.

Purpose of the Study

The purpose of this quantitative casual comparative study was to examine the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the program. The second research question in the study investigated READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores. The READ180 program was the independent variable. The students' 2015 TerraNova reading scores and beginning and ending SRI scores from the 2014-15 school year were the dependent variables in the study. The TerraNova is a standardized norm-referenced assessment of students' mastery of grade level curriculum (McGraw-Hill, 2008). The SRI is a

computer-generated test that measures students reading ability by assessing reading comprehension through computer adaptive scoring (READ 180, Next Generation, 2012).

Research Questions and Hypotheses

Research Question 1: What is the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the READ180 program?

$H_0$1: Participating in the READ180 program has no statistically significant difference in fourth-grade African American male students' TerraNova reading scores.

H_a1: Participating in the READ180 program has a statistically significant difference in fourth-grade African American male students' TerraNova reading scores.

Research Question 2: What is READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores?

$H_0$2: Participating in the READ180 program has no statistically significant effect on fourth-grade students' SRI scores.

H_a2: Participating in the READ180 program has statistically significant effects on fourth-grade students' SRI scores.

An independent *t*-test was used in the study to compare TerraNova mean scores of students who received the treatment to those that did not. A paired *t*-test was used in this study to compare the READ180 participants' beginning and ending academic year SRI

scores. Chapter 3 will provide detailed information on the research question and the hypotheses of this study.

Theoretical Framework of the Study

The theoretical basis for this study was Vygotsky's (1978) theory of cognitive development. The area between students' independent ability and supported ability was defined as the zone of proximal development (ZPD). Vygotsky's theory of cognitive development was appropriate for this study because it suggested that learning was maximized when students worked within their ZPDs with a more knowledgeable other. READ180 applied the theory by providing targeted instruction at students' assessed reading levels. In the theory of cognitive development, scaffold instruction aided student success by bridging skills too difficult for students to accomplish independently but were achievable with a more knowledgeable other (Vygotsky, 1978).

READ180 served as the more knowledgeable other and used scaffold instruction to support student learning based on individual assessments. A quantitative examination of scaffold instruction found teaching approaches that recognized students ZPD led to greater retention of learning (Wass & Golding, 2015). The authors' analysis of ZPD revealed scaffold instruction enhanced cognitive growth by adding depth and breadth to learning. The outcome of Wass and Golding's study aligned with the theory of cognitive development overreaching thought that student development was related to the support students received from a more knowledgeable other when completing tasks too complicated to complete unaided (Vygotsky, 1978).

The READ180 program provided learners with constant feedback within each activity and zone of the program to aid success. The feedback generated by the program provided individualized guidance allowing instructional support to increase and decrease as the student became more proficient which aligned with scaffold instruction. The study investigated the READ180 programs' effect on the reading aptitude of fourth-grade African American male students who participated in the program. In Chapter 2, a more detailed explanation of the study's theoretical framework is discussed.

Nature of the Study

The ex post facto design was selected because the participants were not randomly assigned to the study and the data was not manipulated (Brewer & Kuhn, 2010). The study used archival TerraNova standardized assessment data and archival SRI scores from the 2014-2015 academic year. No manipulation of the variables was applied in this study. Quantitative data concerning READ180 students were collected from the final reports prepared by the reading specialists in Sunnyside school system. The collected data contained READ180 students' gender, race, 2015 TerraNova reading scores and READ180 students' beginning year and ending academic year SRI scores recorded from computerized testing that occurred in-school. The data for nonREAD180 fourth-grade African American male students were collected from annual standardized testing school reports. The TerraNova standardized scores were obtained from the examiner, McGraw-Hill, via school report. The study used a purposive sampling of READ180 participants

Archival data for a sample of 26 fourth-grade participants were used in the study. Greater than half (19 students) formed the control group of the study. Participants

totaling seven were drawn from a population of READ180 participants. Students were enrolled in READ180 if they scored less than 25% on the reading subsection of the previous years' TerraNova assessment and had parental consent.

The posttest design was used to assess the effectiveness of READ180 program (Table 1). The design was used to compare fourth-grade African American male students participating in READ180 TerraNova standardized assessment scores to students who did not receive the intervention. The non-equivalent control group posttest-only design uses a posttest and a control group (Campbell & Stanley, 1963, p. 25). The groups used in this study were not randomly created. The participants in the experimental group scored 25% or lower on the 2014 school year TerraNova reading assessment. The TerraNova standardized reading test served as the posttest. I used inferential statistics to analyze the data.

Table 1

Non-equivalent Control Group Design

	Posttest
X (READ180)	O_1 (treatment group)
	O_2 (nonequivalent control group)

In contrast to the TerraNova, the SRI which occurs quarterly as part of Sunnyside school system's curriculum does not require parental permission. Sunnyside classroom teachers and reading specialist consider SRI levels as an additional indicator of reading

ability and need for READ180 services. Generally, students that are referred to the READ180 program begin the intervention two levels or greater below grade level. Therefore, assessing students' reading improvement by measuring growth after the reading intervention was relevant to this study.

The one-group pretest-posttest design was used to assess the effectiveness of READ180 program (Table 2). A one-group pretest-posttest design was used to evaluate one group scores before and after receiving treatment (Allen, 2017). The design was used to measure fourth- African American male students participating in READ180 beginning and ending year S RI scores. In Chapter 3, the detailed procedure for data collection and analysis that took place is discussed.

Table 2

One-Group Pretest-Posttest Design

Pretest	Treatment	Posttest
O_1	X (READ180)	O_2

Definitions

Differentiated instruction: An instructional model encompassing instruction, assessment, curriculum, classroom environment, and classroom management. Student learning is enhanced by connecting student's prior knowledge, interests and learning styles to learning guided by specified goals (Tomlinson & Moon, 2013).

Every Student Succeeds Act. Bipartisan legislation that reauthorizes the Secondary Education Act and requires schools to focus student learning on college and career readiness (Young et al., 2017).

Lexile. A numerical measure between 100-1500L that represents the student's reading level as indicated by SRI assessment and text readability level based on the Lexile framework for reading (READ 180, Next Generation, 2012).

Proficient reading: Reading and understanding grade level materials in accordance with grade level standards (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015).

READ180. An adolescent literacy intervention designed for struggling readers in grades 4-12. Comprised of small group reading instruction, independent reading practice, and reading instruction via interactive software (READ 180, Next Generation, 2012).

Reading comprehension. The cognitive process in which meaning is made from the text by understanding the vocabulary, relating prior knowledge and drawing an inference as produced by decoding and linguistics (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015).

Response to Intervention (RtI). A multi-tiered model designed to assist at-risk students comprised of three service delivery modes with varying degrees of educational time and intensity. Tier 1 students receive standard classroom instruction. Tier 2 students experience targeted small group supplement learning. Tier 3 students need individualized instruction and intensive support to achieve success (Fuchs & Fuchs, 2017).

Scholastic Reading Inventory (SRI). A research-based interactive reading assessment administered four times a year and used to measure reading comprehension using computer adaptive software (READ 180, Next Generation, 2012)

TerraNova. A standardized norm-referenced assessment of students' mastery of grade level curriculum (McGraw-Hill, 2008).

Tutoring system: computer programs that provide individualized instruction (Ma, Nesbit, Liu, & Adesope, 2014).

Assumptions of the Study

I made the following assumptions for this study. The READ180 program was implemented according to the guidelines provided by Scholastic, the vendor. Assumption two, all participants enrolled in the READ180 program scored below 25% on the TerraNova standardized reading assessment to ensure program reliability. This assumption was in alignment with the program guidelines. Assumption three required all participants' enrollment in the READ180 program did not exceed 2 years to maintain alignment with program specifications. Last, the READ180 program was facilitated by a reading specialist. The assumptions were necessary to ensure the program was followed with fidelity according to the vendors' guidelines.

Scope and Delimitations of the Study

The scope of this study only included regular education African American male students in fourth-grade from schools in the Sunnyside school system. The participants in the experimental group for this study had a reading score below 25% on the reading component of the TerraNova annual assessment. The participants have a beginning and

ending SRI score. The study did not include female students or students with scores higher than 25% on the 2014 TerraNova reading assessment. In addition, this study did not include special education students as Sunnyside school system's policy was to ensure special education students are serviced according to individualized educational plans. The control group only included fourth-grade African American male students. This research path was chosen because school interventions and instructional practices that are customizable to students' needs increase all students' academic success (Denton et al., 2014). The theory of cognitive development was used as the study's framework because it undergirds this finding. The study did not include self-determination theory or information processing theory.

Limitations

One restriction of the study was a small experimental sample size. The READ180 program services approximately 45 students per school in accordance with Scholastic's program guidelines of 15 students per group (READ 180, Next Generation, 2012). Another noted constraint of the study was the use of nonrandom sampling. The study used purposive sampling a technique that allowed the researcher to select members of a group (Nachmias & Nachmias, 2008). Also, the difference in instruction could also be a limitation. READ180 students would have received twice the ELA instruction than their peers. An additional limitation of the study was the availability of extra reading support provided by the school which could influence reading improvement. Since Sunnyside school system allocated extra duty resources based on aggregate numbers in need of service; tutors were not required to maintain records of individual student attendance or

duration of tutoring. Teachers received stipends to facilitate programs and tutoring. Another conceivable limitation of the study could be incomplete or missing data. The wholeness of the dataset was unknown because the archived data that was used in the study was not collected by the researcher.

After Data Recognition Corporation, a publisher of K-12 educational assessments scored the TerraNova assessments they were sent to the schools by mail and compiled into groups by the guidance counselors. After which, reading specialists at each school collected TerraNova assessment scores from school records. Last, program selection may also be a limitation because the students were placed into the experimental group (READ180) based on scores below 25% on the reading portion of the TerraNova. This narrow focus may limit the generalizability of the findings to students performing in the lowest quartile. Teachers reviewed students' SRI score, but placement into READ180 was based on the students' TerraNova reading score.

Significance of the Study

Reading is a complex process that influences success throughout life. Despite RtI models designed to prevent further reading difficulties in struggling students, 53% of the nation's African American male students in fourth-grade read below grade level. Although Sunnyside school system's percentage of below-basic readers was smaller than the national average, a noteworthy amount had not reached proficiency in reading. One reason the students' may not have thrived could be there was not enough research for teachers to maximize the program's usefulness. Multiple studies focused on the

individual the components of READ180 such as computer-assisted instruction and elements of reading (Keengwe & Hussein, 2014; Keyes, Cartledge, Gibson, & Robinson-Ervin, 2016; Kim, 2015). However, intermittent studies have explored READ180 RtI effectiveness with fourth-grade African American male students (Cheung & Slavin, 2013; Parker et al., 2013). The results of the study contributed to the literature on minority reading achievement with a focus on READ180.

Local education authorities, school districts, vendors, and researchers can reference this study's findings to advance the use of READ180 as a RtI at the Tier 2 level. The study expanded the existing literature on READ180. Additionally, the study may be used to inform education systems selection of reading intervention programs. Educational systems support ESSA by monitoring the effectiveness of implemented interventions. Schools can increase intervention effectiveness used as a schoolwide resource if they are evaluated for applicability to all populations.

This study had the potential to expand research on READ180 and elementary students which were a missing component in current research (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). Likewise, the study was important because it may identify an effective reading intervention capable of increasing the percentage of fourth-grade African American male students capable of reading on grade level. The outcome of this study was important because it supported Sunnyside school system's community strategic goals of a) student excellence and organizational excellence and; b) improving student achievement through instructional strategies that accommodate learning needs. When school systems fail to

teach African American male students to read proficiently and to think critically, it diminishes their citizenship, because the students are less capable of meaningfully participating in society (Freedson & Eastman, 2016; Ortliebe & Mc Dowell, 2015).

Summary

Chapter 1 is an introduction to the study. In this chapter, I include a problem statement that identifies a research gap concerning READ180 as a Tier 2 intervention. I also outline the purpose of this causal-comparative study as a test of the theory of cognitive development that related READ180 to the reading achievement of fourth-grade African American male students that attended schools in the Sunnyside school system. READ180; a computer-based reading program was an independent variable. The dependent variables were students TerraNova reading scores and SRI scores. Also, in this section, the significance of the study is outlined as having social implications for reducing the marginalization of an underperforming group. A review of the literature and the theoretical framework for the study is provided in Chapter 2.

Chapter 2: Literature Review

Introduction

Despite Sunnyside school system's use of the READ180 program, 22% of their African American male students in fourth-grade have not achieved basic reading capabilities (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). The purpose of this study was to examine the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the READ180 program.

Literature Search Strategy

Using the Walden University Library, I searched the following databases: Education Source, Academic Search Complete, SAGE journals and SAGE Encyclopedias and Research Starters. I used the following keywords in various combinations in the searches: black male students, African American male students, struggling male students, struggling readers, READ180, male readers, black male readers, response to intervention, achievement, achievement gap, scaffold instruction, and instructional software. Additionally, the following online journals were reviewed: Reading Research Quarterly, Reading and Writing Quarterly, Journal of Research in Reading, Reading Psychology, Education Research Quarterly, The Reading Teacher, Reading Improvement, Journal of Learning Disabilities, Exceptional Children and Teaching exceptional children, Journal of Elementary Education, Educational Quest, Learning and Individual Differences,

Teaching and Learning, Language, Culture and Curriculum, E-learning and Education, Literacy Research and Education, and Journal of Negro Education.

Peer-reviewed studies from the years of 2013-2017 were reviewed for this study. My search revealed three peer-reviewed articles and four dissertations on the READ180 program. Themes related to the topic were researched to find additional readings relevant to the study. Since READ 180 is a learning system, literature on learning systems and reading instruction was used as keywords in the search. Then reading instruction and RtI was researched because both are components of the READ 180 program.

Theoretical Foundation

The theoretical framework for this study was Vygotsky's theory of cognitive development. Vygotsky was concerned with how successful students performed tasks in learning situations when collaborating with a more knowledgeable other. Several propositions of Vygotsky's (1962) theory applied to the study: (a) academic lessons are the foundations from which student learning develops, and fragment lessons stagnate learning; (b) learning is enhanced when content skills are introduced when students are cognitively prepared to learn; (c) learning is greater as a result of teacher-student interaction which fosters higher mental functions; and (d) learning is further heightened when regular measurement of students' conceptual development takes place. In summary, the theory indicates teacher instruction, student maturation, tutor-tutee interaction, and feedback as critical concepts of influence in the learning process. (Vygotsky, 1962). Thus, the purpose of education is to use these influencers to maximize growth in the ZPD.

Vygotsky believed instruction should occur within the ZPD; defined as the area of development between the independent and supported area of performance (Vygotsky, 1962). In this study, the theory of cognitive development was applied to the READ180 adaptive reading program; as the more knowledgeable other the program provided scaffold reading instruction within students' ZPD. Researchers have found computer-based instruction to be an effective intervention strategy in educational settings for both genders and all grade levels (Ponce, Mayer, & Lopez, 2013). READ180 is a computer-based interactive reading program that uses Vygotsky's theory of cognitive development to remediate struggling readers. The READ180 program used adaptive technology and scaffold instruction to move below-grade-level readers towards grade-level reading (READ 180, Next Generation, 2012). Vygotsky's theory suggested scaffolding has short-term and long-term benefits to general cognitive abilities.

An analysis of four quantitative meta-analyses that applied the theory of cognitive development in educational settings with a concentration on scaffold instruction showed a consistent theme of improved cognitive outcomes across various contexts with varied populations of learners (Belland, Walker, & Kim, 2017; Belland, Walker, Kim, & Lefler, 2016; Belland, Walker, Olsen, & Leary, 2015; van de Pol & Elbers, 2013). Although the format and method of scaffolding have evolved from preschool students using a one-to-one format, it remains a valuable instrument to support all populations of learners (Belland et al., 2016). In this section, I discussed scaffold instruction, reading instruction, differentiated instruction, computer-aided instruction, and READ 180.

I selected Vygotsky's theory of cognitive development because it recognized the importance of scaffolding in learning. The theory was also chosen because research has shown that scaffolding is the underpinning of effective teaching (Vygotsky, 1962). The term, *scaffolding,* was an easy concept for stakeholders to understand when discussing the benefits of intervention programs such as READ180 program. Scaffolding was a technique regularly operationalized by teachers to progress learning because it was appropriate for any grade level or content area (Belland et al., 2015; Johansson & Wickman, 2017; Pentimonti et al., 2017).

The theory related to the present study because READ180 and RtI rely on scaffold instruction. The READ 180 program's adaptive technology provided reading instruction based on students' assessed reading levels and literacy needs (READ 180, Next Generation, 2012). The research questions related to the theory because it assessed the products of the theory's application. In this study, the effectiveness of the READ 180 program's scaffold instruction was measured by the TerraNova standardized assessment scores. Table 3 shows the percentage of fourth-grade students in Sunnyside school system's that scored below 25% on the 2015 TerraNova assessments. These students were eligible for READ180 services. The table showed a double-digit percentage of fourth-grade students throughout the district that were not proficient readers.

Table 3

Sunnyside School System Enrollment

Enrollment Total School	Grade 4 Student Totals	TerraNova Scores Below 25%
School A-318	33	12%
School B-400	136	10%
School C-600	90	11%
School D-470	61	11%
School E-600	94	14%

Literature Review Related to Key Variables/Concepts

Scaffolding

Scaffolding is a widely accepted and commonly employed teaching approach that is not restricted to the education arena. Scaffolding moves students' learning from descriptive knowledge to understanding and reasoning of concepts. In this study, the applicability of scaffold instruction was evaluated through scaffolding designs, environments of scaffold instruction, and the intensity of scaffolding. Belland et al., (2015) quantitative meta-analysis on specific types of computer-based scaffolding found that scaffolding should not be used as a separate intervention strategy but in conjunction with another support strategy. Also, the authors of seven study meta-analysis of studies involving middle to high school students found that reducing support or scaffolding

created inconsistent skill acquisition and hindered the transfer of responsibility for learning and skill mastery (Belland et al., 2015). It was also noted that although scaffolding is an effective strategy, type of scaffolds used, i.e., conceptual or metacognitive produced different cognitive outcomes (Belland et al., 2015).

In a similar study, Belland et al., (2016) quantitative meta-analysis of the impact of computerized scaffolding in STEM education found computerized scaffolding produced significant gains in problem solving in STEM education. The authors described the influence, context, and characteristics of scaffolding from a total of 144 studies from elementary school to high school students to measure cognitive outcomes. The authors did not find inconsistent skill mastery as scaffolding was reduced reported by Belland et al. (2015). Their results indicated a gradual reduction in support produced the same influence on students' problem-solving ability as maintaining constant support (Belland et al., 2015). It was also determined that scaffolding implemented based on the needs of the learner was more effective than scaffolding based on the situation. Scaffolding should be applied within acceptable tolerance ranges to avoid feelings of reduced self-efficacy, motivation, learning, or frustration (González-Calero, Arnau, Puig, & Arevalillo-Herráez, 2015).

Equally important was González-Calero, et al., (2015) quantitative meta-analysis involving 79 undergraduate students that focused on learning environments. The authors determined learning environments affected scaffold instruction in problem-solving provided by tutoring systems. Learning environments categorized as intense or nonintensive were distinguished by the degree of assistance the tutorial provided during

the learning phase. The authors found intensive scaffolding provided by learning systems produced greater comprehension of resolution processes (González-Calero et al., 2015).

Subsequently, comparable results were found in a quantitative meta-analysis study of tutoring systems conducted by Ma et al., (2014) in which computer-based instructional outcomes were compared to traditional classroom instruction outcomes. The authors found results from scaffolding provided by tutoring systems were more significant than small group tutoring by a teacher. Scaffolding by learning systems produced the same effect as one on one tutoring. The authors attributed the difference on effect to the computer's ability to provide timely and specific feedback (Ma et al., 2014).

Similarly, Steenbergen-Hu and Cooper's (2013) quantitative meta-analysis of 26 studies compared the efficiency of teaching systems to classroom instruction. The authors found that learning systems did not produce more significant math results than classroom instruction (Steenbergen-Hu & Cooper, 2013). Positive associations between teacher support and student learning are most effective at the onset of learning and continue to the point of verified understanding (van de Pol & Elbers, 2013).

To clarify the relationship between learning and learning systems Steenbergen-Hu and Cooper's (2014) expanded the exploration of learning systems in their 2014 meta-analysis from one tutoring system to 22 different tutoring systems. Generalizing the effectiveness of the learning system in higher education settings was the researcher's goal. The authors discovered that subject matter, duration of instruction, and engagement influenced the effects of the learning systems (Steenbergen-Hu & Cooper, 2013). Computer-assisted scaffold instruction has been found to improve cognitive growth. The

findings in this study indicate scaffolding magnified student learning and engagement. The READ180 program provides students with skill-specific feedback before, during, and after practice to support skill attainment (READ 180, Next Generation., 2012) within their assessed levels.

Zone of Proximal Development

Scaffolding increased learning when applied in context and within the learner's zone of proximal development. ZPD is defined as the area between independence and frustration (Vygotsky, 1962). Teaching within the students' ZPD served the dual purpose of challenging students while supporting learning when practicing unmastered skills (Vygotsky, 1978). The benefits of applying the strategy of instructing within students' ZPD challenge and appeal to educators. One of many recognizable challenges stemmed from various student abilities and limited instruction time; whereas skill attainment was chief benefit. In traditional educational approaches, preceding computer instruction, Vygotsky's theory of cognitive development viewed the student-teacher relationship as paramount.

Vygotsky's beliefs were thought to be centered on a) the teacher serving as the more knowledgeable other and b) an underlying premise of the theory of cognitive development linking learning and sociocultural contexts (Danish, Saleh, Andrade, & Bryan, 2017). As fourth-grade students spend most of their instructional day with the same teacher, it was beneficial to understand the impact of the teacher-student relationship as a potential mediating factor to READ180 success. The student-teacher relationship can be a factor of influence on students' accomplishment in the READ180

program because responsiveness, classroom routines, and instruction assistance which shapes learning were predicated on the teacher (Rimm-Kaufman, Baroody, Larsen, Curby, & Abry, 2015). Although READ180 has a computer component, two-thirds of the program (small group station and independent reading station) required student-teacher interaction.

In this study Wubbels et al. (2014) definition of teacher-student relationship defined as daily, personal meaning students and teachers ascribe to their exchanges which form a connection was applied. Ratcliff et al., (2017) found teach-student relationships influenced educational performance as students identified the relationship as close to teacher or conflict with the teacher. From their longitudinal study of approximately 1200 third through fifth-graders, students' race was a perceived influencer of conflicted teacher-student relationships. The authors found students that were of the same race as the teacher, usually Caucasian, enjoyed more latitude for misbehavior and more encouragement to perform in academic settings than African American males (Gershenson, Holt, & Papageorge, 2016; Kumar, Burgoon, & Karabenick, 2015; Ratcliff et al., 2017). Students' perceived inability to meet teacher expectations was noted as a universal source of a conflictual teacher-student relationship. Similar results were found on McCormick and O'Connor's (2015) longitudinal study of teacher-student relationships influence on academic achievement. The data revealed high levels of teacher-student conflict were linked to low reading achievement (Hajovsky, Mason, & McCune, 2017; McCormick & O'Connor, 2015).

In contrast to Ratcliff et al. (2017), gender, not race was noted as a source of conflict that decreased reading achievement. Perhaps the difference in outcomes was the result of the number of African American students involved in the study. Both studies used longitudinal data from first, second, and fifth-grade students, in contrast, McCormick and O'Connor's African American population was half the size of the population in Ratcliff's et al. study. More importantly, research has shown that teacher-student relationships may have long-term consequences for achievement (Gershenson et al., 2016; Hajovsky et al., 2017; McCormick & O'Connor, 2015; Ratcliff et al., 2017).

Reading Instruction

Opinions differed about direct instruction, or guided instruction being the most effective instruction method for delivering reading instruction (Crevecoeur, Coyne, & McCoach, 2013; Marchand-Martella, Martella, & Lambert, 2015; Wanzek, 2014). However, phonemic awareness, phonics, vocabulary, fluency, and comprehension were foundational components of reading irrespective of the approach (National Reading Panel, 2000). The READ 180 program had two zones that provided students with direct teaching in the components of reading. The reading zone facilitated practice in fluency; vocabulary, comprehension, and the language zone facilitated practice in decoding (READ 180, Next Generation., 2012). Commercial reading programs were found to underutilize direct instruction in favor of the guided practice approach to instruction (Reutzel et al., 2014). The guided practice model was found to be minimally effective for the integration of reading skills because the approach limited students' use of prior knowledge and skill application in novel settings. Previous research has provided

evidence that prior knowledge, motivation, metacognitive are predictors of reading comprehension (Proctor, Daley, Louick, Leider, & Gardner, 2014; Schiefele et al., 2016). The explicit model of instruction required teachers to systematically model learning while guiding students towards purposeful learning objectives based on the teaching that built-in complexity (Denton et al., 2014). The explicit model of reading instruction, as demonstrated by teacher modeling, student practice, and targeted feedback promoted meaningful learning. An analysis of articles related to differentiation suggested direct instruction was embedded in differentiated instruction to providing students with rich learning opportunities (Callahan, Moon, Oh, Azano, & Hailey, 2015; Firmender, Reis, & Sweeny, 2013; Puzio, Newcomer, & Goff, 2015). Students in the READ180 received teacher and computer-facilitated direct instruction. The reading teacher used scripted text to support reading instruction, and the READ180 program used individual computer-adapted leveled text to support reading.

Direct reading instruction was an essential method of reading education and was applicable in any phase of the reading process. Direct or explicit reading instruction gave students systematic instruction and clarifies procedures (Doabler et al., 2015). Explicit instruction typified by the following components (a) teacher modeling, (b) student practice, and (c) feedback during instruction (Doabler et al., 2015). The researcher's characterization was based on two years of observing elementary students during reading instruction to understand the relationship between achievement and instruction (Doabler et al., 2015). The study's results indicated that direct instruction without student

engagement did not enhance learning; whereas student questioning as teachers modeled during instruction lead to learning gains (Doabler et al., 2015).

Similarly, positive results were associated with the explicit instruction in a quantitative study used to measure sentence reading efficiency, fluency, and comprehension, one the reading comprehension subtest of the Wechsler Individual Achievement Test (Ritchey, Palombo, Silverman, & Speece, 2017). The authors found explicit reading instruction improved 48 fifth grade struggling students' skill acquisition but did not increase the students' overall reading comprehension. In addition to dissimilarities in study design, populations used in the studies were also dissimilar. Unlike the participants in the study conducted by Doabler et al. (2015) in regular education classrooms, Ritchey et al. (2017) studied students identified with learning disabilities. Although the studies had different concentrations of reading both acknowledged the effectiveness of direct instruction.

In another study of primary students, results indicated explicit reading instruction produced significant differences in struggling first-grade students reading comprehension compared to guided reading instruction (Denton et al., 2014). The authors discovered students that received explicit instruction made more gains compared to students in the guided reading group when measured on the Woodcock-Johnson III Test of Achievement, Texas Primary Reading Inventory, and Test of Silent Reading Efficiency and Comprehension. Denton et al. suggested demystification of skills with explanations and models increased the struggling readers' academic gains in reading. In another study, explicit instruction combined with scaffolding produced intensive but meaningful

learning for primary students (Nelson-Walker et al., 2013). The authors' quantitative longitudinal study results revealed that explicit instruction provided at-risk students with the structure and support needed to be successful in traditional classrooms. Similarly, a quantitative study with a sample of 1500 in grades third through fifth found instruction that used set strategies and practiced the strategies produced greater gains than instruction involving multiple strategies (Droop, van Elsäcker, Voeten, & Verhoeven, 2016). The findings were consistent with the National Reading Panel (2000) suggestion that limiting the number of instructional reading strategies was more academically beneficial than numerous reading strategies (Droop et al., 2016;

In contrast, Lenhard, Baier, Endlich, Schneider, & Hoffmann (2013) argued the effects of the guided instruction generated more significant influence on reading comprehension than teacher-directed instruction. In Lenhard's et al., study a tutoring system was used to facilitate the guided instruction. The authors' purpose for conducting the study was to investigate the different outcomes of instructional methods. A test on the skill of summarization revealed that sixth-grade students who received explicit instruction scored lower in reading comprehension compared to students practicing with a tutoring system. The authors suggested skill practice in which immediate feedback was given enhanced students' meta-cognitive knowledge and served as a precursor to skill acquisition. Researchers contend that practice requiring higher order thinking skills in addition to feedback enhance students' metacognitive knowledge (Afflerbach, Cho, & Kim, 2015).

The debate regarding the most effective approach to reading instruction continued as Hushman and Marley (2015) reported similar results of direct instruction limiting student's independence in learning. Hushman and Marley reported fifth-grade students who received direct instructions in problem-solving produced fewer experiments than students who received guided instruction. A noted difference that could have influenced the results was the author's blended direct instruction into guided instruction by questioning students until the correct response was acquired (Hushman & Marley, 2015).

Teacher Quality

In the continued age of standardized testing and school accountability society relied on school principals to hold teachers accountable for all students' learning (Yeh, 2017). Research indicated that quality teachers were essential for improving African American male students' reading outcomes (Caughlan & Jiang, 2014; Curry, 2014; Goldhaber, Lavery, & Theobald, 2015; Yeh, 2017). The controversial issue of teacher quality remained unanswered as a critical component because determining teacher quality required the vetting and use of a fair, unbiased, and efficient tool for conducting evaluations.

Research indicated insufficient central themes and varied state requirements as a barrier to implementing a universal scale capable of measuring teacher quality (Chambers & Tate, 2015; Skourdoumbis, 2017). Many stakeholders believed student outcomes determined teacher effectiveness which aligns with the concept of value-added measures (Chambers & Tate, 2015; Skourdoumbis, 2017). In a quantitative longitudinal study focused on teacher quality value-added ranking was denounced as a reliable method for

predicting teacher quality or student achievement (Yeh, 2017). The author argued that the measure failed to account for chance student placement, student self-efficacy, and school environment. In a similar setting, another quantitative study of 455 elementary schools test scores and school demographic found that teachers considered quality teachers according to value-added measures did not increase the aggregate growth of African American students (Chambers & Tate, 2015).

Furthermore, the authors argued that race and socioeconomic status profoundly influenced value-added measures and should not be used as a universal assessment tool. A review of evaluations found none of the current forms of teacher evaluations recognized by the National Council for the Accreditation of Teacher Education (NCATE) addressed student outcomes (Gargani & Strong, 2014). The authors recommended the Rapid Assessment of Teacher Effectiveness (RATE) as an empirically designed evaluation tool capable of measuring teacher effectiveness based on student achievement instead of state standards (Gargani & Strong, 2014). In opposition to the findings, Knight et al. (2015) suggested measurable process-product outcomes should indicate teacher effectiveness instead of narrowly focused standardized assessments. In a longitudinal study of 1,100 third through fifth-grade students' reading achievement, Palacios (2017) found teachers' qualifications comprised of education, and experience had negligible effects on elementary students' reading. An unexplained finding in the study was the correlation between minority numbers and reading level. When the number of students of color in the classroom increased, the overall reading attainment decreased (Palacios, 2017). Although both authors focused on important components of education, their

perspectives were on opposite ends of the education continuum. Whereas the study conducted by Knight et al. (2015) concentrated on professional development, Gargani, and Strong's (2014) study fixated on accountability, neither study considered Palacios (2017) emphasis that teacher influences and classroom environments influenced achievement up to two years beyond the current grade. In addition to teacher quality, learning environments are another important component in education believed to influence achievement.

Learning Environments

Research indicated that teacher expectations were essential to inclusive and productive classroom environments (Back, Polk, Keyes, & McMahon, 2016; Kumar et al., 2015; Lambeth, & Smith, 2016). As explained by Ford and Moore (2013) the need for school achievement to be the expectation for all learners was a means of continued societal and international success. A foundational component to universal expectations was exposing and correcting deficit thinking assists in implementing culturally responsive teaching, empowering students, and raising achievement (Lambeth & Smith, 2016). In agreement with removing limitation set by deficit thinking, Ndemanu (2014) suggested that retooling teacher expectations and awareness positively transformed learning environments. The theory of reasoned action supported changing teacher attitudes as a strategy to improve learning environments to support the reading achievement of African American male students (Kumar et al., 2015).

Researchers synthesis of school climate and achievement noted encouraging school atmospheres strengthened academic achievement irrespective of background and

could foster equality in learning (Berkowitz, Moore, Astor, & Benbenishty, 2017). Moreover, this study maintained socioeconomic status does not have to influence school climate. Atmospheres and practices that challenged students to perform above their assessed ability were found to create more significant achievement outcomes than students instructed in non-challenging atmospheres (Palacios, 2017).

According to Bronfenbrenner's ecological theory, classroom environments, school staff, and systemic school core beliefs formed interrelated components of school climate affecting student outcomes (Back et al., 2016). Implications from the study suggested in addition to classroom instructional practices; classroom management was an essential part of school climates. Classroom management styles that recognized cultural differences and maintained high expectations were noted as precursors to academic achievement for all students.

Multiple studies reported a link between school climate and African American male students' reading ability (Chambers & Huggins, 2014; Ford & Moore, 2013). Failure to acknowledge the link between school climate and African American male students' reading success placed the blame on students or out of school factors (Wasserberg, 2017). The author submitted that high stakes testing, and stereotype threat limited African American students' exposure to grade level instruction instead of rote skill-based instruction which created an ability-based environment.

Differentiated Instruction

As a focused form of reading instruction, differentiated instruction is an effective tool for supporting reading achievement (Ankrum, Genest, & Morewood, 2017;

Firmender et al., 2013; Little, McCoach, & Reis, 2014; Suprayogi, Valcke, & Godwin, 2017; Valiandes, 2015). Differentiation commonly applied in educational settings balance differences in learning because of differences in ability, exposure or culture (Puzio et al., 2015). The effect of academic differentiation lies in the versatility of application; it was not only used with low or struggling students. High achievers and gifted students also benefited from differentiated instruction (Callahan et al., 2015; Firmender et al., 2013). The authors noted that differentiation was a way to reverse failure, of students viewed as outliers to mainstream education, by providing alternative instruction (Tomlinson & Moon, 2013).

Differentiation was most effective when teachers are familiar with their students' learning strengths and preferences (Robb, 2013). African American male students' reading grades improved when a differentiated curriculum was implemented (Robb, 2013). The data from 109-middle school African American male students suggested differentiated reading instruction was a practical approach to mediating the poor reading ability of African American male students. Effectiveness was attributed to teachers' use of alternative instructional modes of grade level course content. Their instrument of measure, report card grades, indicated student improvement by higher final grades. Differentiated instruction or strategy engaged students in learning (Goddard, Goddard, & Kim, 2015). Differentiation and scaffolding expanded students' declarative knowledge as it helped students understand reading strategies and text (Droop et al., 2016).

For that reason, Valiandes (2015) agreed differentiated instruction bridged achievement and student learning by matching instruction to learning needs, strengths,

and developmental levels which promoted educational equity. The study suggested teacher competence in teaching and willingness to depart from traditional teaching approaches was the link between effective differentiation and reading achievement (Caughlan & Jiang, 2014; Curry, 2014; Goldhaber et al., 2015; Yeh, 2017). The authors found the systematic use of differentiated instruction in 24 classes of mixed ability fourth-grade students maintained high expectations and improved the reading success for all students without consideration for race or socioeconomic status.

On the contrary, Goddard et al., 2015 found differentiated instruction was not consistently utilized in elementary schools, (Dijkstra, Walraven, Mooij, & Kirschner, 2016) although teachers were aware of the educational benefits to diverse levels of learners, i.e., African American male students. The findings from the study suggested differentiation should be implemented as a school approach instead of a teacher approach to maximize the application to instruction and student needs. Principals have pivotal roles in leading, influencing, supporting, and monitoring the use of instructional practices of differentiation (Puzio et al., 2015). The use of differentiation in educational practices had the potential to transform minority and struggling students reading achievement which could improve reading self-efficacy.

Self-efficacy became an issue because the modified instruction was often interpreted by students as lack of ability which produced low self-efficacy (Harvey, Suizzo, & Jackson, 2016). The authors of the study suggested that differentiated instruction should not focus on skill support alone to avoid perpetuating African American male students' belief that their ability was inferior to that of their peers.

Moreover, curricula that subscribed to the skill drill method of teaching reduced student engagement diminished curricular exchange between teachers and peers, and impair the teacher to student relationship (Wasserberg, 2017).

Differentiated instruction was a strategy applicable to the regular education classroom (Regan, Berkeley, Hughes, & Kirby, 2014). When at-risk populations such as African American male students failed to thrive in regular education classes, they were referred to Tier 2 Response to Intervention programs comparable to the READ180 program. Differentiation supported curriculum expectations by providing options to the modes of instructional delivery based on students' readiness and interest (Tomlinson & Moon, 2013). For example, computer-assisted instruction can be used to differentiate instruction. Computer-assisted teaching has the potential to provide students with engagement and systematic instruction based on learning styles.

Computer -Assisted Instruction

Achievement occurred when students were engaged in learning and took responsibility for learning (Snow, Jackson, & McNamara, 2014). As student ability in classrooms becomes more diverse, engaging all students has become a complex process. Computer-assisted instruction has the potential to engage students at individual levels while providing individualized instruction. In a quantitative study of fifth-grade students who used computer-assisted instruction scored significantly higher than students receiving traditional reading instruction on the Georgia State Reading Test (Wijekumar et al., 2014). The authors attributed the students' achievement to the direct and consistent instruction the program afforded the learners. Also, the authors discovered immediately

providing students instructive feedback during scaffold lessons using the structure strategy in nonfiction reading was also a contributing factor (Wijekumar et al., 2014). These findings were supported by Regan et al., (2014) findings that direct reading instruction via the CAI Lexia Learning System produced small but significant results for K-6 special needs students. The authors noted that CAI provided decoding instruction based on ability level, not grade level (Regan et al., 2014). Decoding is one of five essential reading requirements for reading instruction but in traditional classrooms decoding instruction is taught to K-2 students (National Reading Panel, 2000).

In additional studies assessing CAI's ability to instruct the essential components of reading, Keyes et al., (2016) found 16 weeks of daily practice with the CAI Read Naturally program led to an average increase of 13 correct words per minute on the Oral Reading Fluency test. The authors found student grow in fluency was connected to their ability to transfer learning to novel reading situations. (Keyes et al., 2016). Similarly, Keengwe and Hussein's (2014) study indicated positive results for low performing students receiving supplement computer-based reading instruction. The study suggested low performing students' experienced increased reading motivation and reading engagement which led to a significant increase in reading scores. The Northwest Evaluation Association longitudinal data indicated a higher mean score for students receiving computer-aided instruction compared to traditional reading instruction.

In contrast, Fenty, Mulcahy, and Washburn (2015) found inconclusive results such as CAI instruction lead to more substantial gains than teacher-led instruction on the Dynamic Indicators of Basic Early Literacy Skills assessment. Although both studies

used at-risk populations of students; the service format or setting could account for the research outcomes. Keyes et al. provided small group services in a separate setting using a one-to-one format; Fenty et al. used a small group format. Research also indicates CAI is an effective means for instructing reading comprehension which is crucial for fourth-grade students to attaining for 21st skills (D'Agostino, Lose, & Kelly, 2017; Lysenko & Abrami, 2014; Shannon, Styers, Wilkerson, & Perry, 2015).

Also, Fogarty et al. (2017) found comprehension circuit training a practical and effective intervention with sixth through eighth-grade students' two grade levels below their current grade. The authors indicated the program did not have a statistical difference with students that were just below grade level on the State of Texas Assessments of Academic Readiness (Fogarty et al., 2017). All students within a given population will not succeed using the prescribed intervention (Snow et al., 2014). The authors suggested the multi-component design of the program may have inadvertently suppressed student's reading experience and growth (Fogarty et al., 2017).

Computer-assisted instruction, computer-assisted learning, adaptive learning technology, and intelligent tutoring systems were all technological approaches designed to assist learners in achieving targeted outcomes. Irrespective of the instructional format, teacher or computer the goal of instruction in education was to provide students opportunities to learn, connect, and explore concepts and strategies that support in-depth learning. When student learning required additional support, schools implemented the response to intervention model to meet the students' need.

Response to Intervention

RtI followed a multilevel systematic evidence-based method of instruction to affect change in at-risk students' progress (Marchand-Martella et al., 2015; Xu, 2013). RtI, part of the Individuals with Disability Act, served the dual purpose of remediating students when behavioral or academic concerns exceed classroom environments and reducing the number of ethnic pupils placed in special education (Gatlin & Wilson, 2016; Robinson, 2016). Although principals and teachers were expected to facilitate academic success by creating learning environments conducive to the needs of all students while adding value to students' social and emotional wellbeing (Chambers & Tate, 2015) African American male students remained marginalized. Three distinct RtI levels exist and are characterized by instruction intensity. Tier 1 intervention occurs in the general classroom as whole group instruction. Tier 2 intervention occurs in a separate setting with small groups and supports the regular education curriculum. Tier 3 instruction occurs in a separate classroom, facilitated by a special education teacher and is based on an individualized educational plan (Fuchs & Fuchs, 2017).

This study focused on Tier 2 intervention occurring outside the general education classroom. Student enrollment was based on below grade level scores on the reading portion of the Terra Nova standardized assessment. RtI Tier 2 supplemented the general education curriculum. READ180 Tier 2, RtI used scaffold instruction in small group and individual settings to maximize student learning and engagement. The intervention was commonly provided during the student's regularly scheduled reading block. Researchers found RtI scheduling that interrupted primary instructional time impeded elementary

students reading achievement (Dallas, 2017; Sharp, Sanders, Noltemeyer, Hoffman, & Boone, 2016). The authors believed limiting exposure to the grade level reading curriculum, due to scheduling conflicts hampered students' reading achievement on the Measurement of Academic Progress. The study suggested that RtI is most effective in conjunction with classroom instruction versus replacement instruction.

In conclusion, RtI allowed teachers to intensify academic learning systematically. The intervention's success depended on teacher's early detection, consistent data collecting and problem-solving strategizing. Early detection and remediation of academically struggling students decreased difficulties and increases the students' chance to catch up with peers (Scammacca, Roberts, Vaughn, & Stuebing, 2015). In the Sunnyside school system, SRI scores and TerraNova scores were measures frequently used to indicate student achievement and to place students in READ180 as an intervention. Based on the findings of Scammacca et al., (2015) quantitative meta-analysis it could be argued that although students may show large increases in SRI scores, smaller gains were associated with standardized assessments. The authors found reading ability showed a statistically significant improvement for the experimental group over the control group in all interventions studied (Scammacca et al., 2015). The authors asserted that students in grades four through twelve benefited from reading interventions but highlighted different effect sizes depending on the focus of the intervention. When compared to fluency, reading comprehension interventions were found to have higher effect sizes (Scammacca et al., 2015). Researchers of a quantitative study of elementary students agreed with the findings from Scammacca's et al. study but added that time

moderated the effect of the intervention (Wanzek et al., 2013). The authors suggested lengthier periods of reading interventions reduced the impact of the program as students became familiar with the program (Wanzek, 2014; Wanzek et al., 2013). The READ180 program was designed to provide support for a maximum of two years or until the student gains grade level skill mastery (READ 180, Next Generation , 2012). Also, the program used five different learning zones with a different format to maintain student interest.

READ180

READ 180 is a reading program implemented to remediate struggling readers using adaptive technology is offered in three stages: Stage A (elementary school), Stage B (middle school), and Stage C (READ 180, Next Generation, 2012). The program was developed by Dr. Ted Hasselbring, Vanderbilt University, Orange County Literacy Project, and Scholastic in 1995, but is distributed by Houghton Mifflin Harcourt (U. S. Department of Education, Institute of Education Sciences, What Works Clearing House, 2016). The program required student participation in daily sessions of 90 minutes or the abbreviated session of 45 minutes of whole group, small group, and individual lessons (READ 180, Next Generation, 2012). During the sessions, students rotated through three stations. At the small group station, students practiced reading and skill development under the instruction of the reading teacher. At this station, learners relied on choral and close reading strategies to enhance reading comprehension (READ 180, Next Generation, 2012). Oral reading supported below grade level readers' comprehension improvement more than silent reading (Dickens & Meisinger, 2016). At the reading station, students practiced independent reading. Here students selected texts to read based on interest and

Lexile level of the text. After reading the book, students took a computer-administered reading counts tests to measure comprehension of the text; a score of 70% is considered passing. The final station required students to follow log into the READ180 program and follow computerized instructions to interact with the leveled text in one of five zones. The ability leveled text instruction progressed through the proficiency driven zones of reading, spelling, word, writing, and success from levels one through four. Results from a quantitative study of students in charter schools found computer-assisted instruction increased student reading motivation, reading engagement and reading scores (Keengwe & Hussein, 2014). The authors found daily systematic computer-assisted reading instruction resulted in twice as many low performing African American students making significant gains on the annual standardized reading assessment than students who received traditional reading instruction (Keengwe & Hussein, 2014). Likewise, Fogarty's et al. (2017) quantitative study revealed multicomponent reading instruction delivered via computer surpassed traditional instruction in the areas of student engagement, instruction pace, and fidelity of services.

In contrast to Keengwe and Hussein's results, all students in Fogarty's et al. did not benefit from the intervention. The middle school students were classified by Texas STAAR annual assessment. Those that scored well below grade level (25th percentile) made significant gains in reading ability whereas students identified as below grade level (50th percentile) reading ability did not show a significant influence because of computerized instruction. Students exited the program once they become proficient readers. Reading proficiency was indicated by Lexile level achieved on the SRI. The

reading teacher collaborated with the classroom teacher on the students' progress to ensure services are no longer required.

READ 180 was found, "to have positive effects on comprehension and general literacy achievement, potentially positive effects on reading fluency, and no discernible effects on alphabetic for adolescent readers" (U. S. Department of Education, Institute of Education Sciences, What Works Clearing House, 2016, p. 1). Similarly, Boulay, Goodson, Frye, Blocklin, and Price's (2015) review of the top 10 reading programs used in elementary schools, found READ 180 an effective intervention for aiding struggling readers. A quantitative randomized study found READ180 had a statistically significant influence on the fourth-,5th, and 6th-grade students' comprehension (Fitzgerald & Hartry, 2008).

In contrast, a later quantitative randomized study conducted by Kim, Samson, Fitzgerald, and Hartry (2010) of fourth- through 6th grade students found READ180 had a statistically significant effect on reading fluency, but not comprehension. While both studies applied the intervention in the afterschool setting, the intervention in Fitzgerald and Hartry's study was for one hour compared to Kim's et al. sample received two hours of intervention. In other randomized studies of READ180 Meisch et al. 2011 found the program had no statistical influence on middle and high school students reading whereas Swanlund et al. (2012) found the program statistically increased literacy achievement. The difference in outcomes could be Swanlund's et al. inclusion of special education students.

In conclusion, the impact of READ180 has produced mixed outcomes on students reading ability. The program was effective in either reading comprehension or reading fluency but not both skill areas. The efficiency with the special education and second language population of students was not discernible in the reviewed studies.

Summary

Reading was a skill that influenced all phases of life and is necessary for future success. It was important to research the effectiveness of reading interventions because it broke apart the universal expectation of the program's effectiveness by defining which populations the program positively impacted (Kim et al., 2016). Moreover, research indicated that early intervention that included phonemic awareness, phonics, vocabulary, fluency, and comprehension was the most effective strategy for correcting reading difficulties (National Reading Panel, 2000). Also, reading instruction that targeted students' identified area of weakness was a more effective strategy for adding depth to learning than standard classroom practices (Frey, Fisher, & Hattie, 2017; Hall & Burns, 2018). In addition, intervention programs must be assessed to ensure they do not teach skills in isolation without addressing comprehension (Jefferson et al., 2016).

Several major themes regarding reading instruction emerged from the literature reviewed in this study. First, scaffold instruction improved students' reading achievement. Second, explicit, systematic, and research-based intervention beyond traditional classroom instruction was critical to averting reading failure. Third, reading intervention that was part of a comprehensive approach to reading versus isolated skill instruction supported literacy development and improved reading outcomes.

A lack of research was found on the effectiveness of the READ180 program and fourth-grade African American male students' reading skills in the literature search. This lack of peer-reviewed research exposed a gap in research where a nonequivalent posttest study could be used to test READ 180's influence on African American male students. The outcome of the study could improve African American male students' reading self-efficacy and academic achievement. In Chapter 3 I review the methodology, setting, and sample used to complete the study.

Chapter 3: Research Methodology

Introduction

The purpose of this quantitative casual comparative study was to examine the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the READ180 program. A nonequivalent posttest only design was used to examine the problem. Additionally, the study was used to explore READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores. A one-group pretest-posttest design was used to examine the problem. This chapter presents information on the study's research design, sample population, setting, treatment, instrument, data collection, and data analysis. The chapter concludes with threats to validity and ethical procedures. In Chapter 4, I discuss the study results.

Research Design and Rationale

In this quantitative, ex post facto study the independent variable was READ180 instruction. The dependent variables were TerraNova reading scores and SRI scores. A quantitative ex post facto study was most applicable to this study because archived TerraNova test data and SRI beginning and ending scores for the 2014-2015 school years from Sunnyside school system was assessed after the fact. Within the quantitative method, the study used a nonequivalent posttest-only control group design and a one-group pretest-posttest design. The nonequivalent posttest-only control group design applied to this study because it allowed the comparison of two groups without a pretest

(Creswell, 2009). As the focus of the study was the TerraNova standardized assessment, a pretest was not viable. Therefore a posttest-only design was appropriate to facilitate the research questions in this study which explored the effects of READ180 by comparing the groups' mean scores of the 2014-2015 school years TerraNova reading assessment. The one-group pretest-posttest design applied to this study because it can be used to evaluate a single group before and after treatment (Allen, 2017). In this study the beginning and ending year SRI scores were evaluated to measure students' Lexile growth.

A nonequivalent posttest-only design was useful in assessing intervention effectiveness in learning situations because the groups were not randomly created (Gammon & Morgan-Samuel, 2005; Gunarhadi, Anwar, Andayani, & Shaari, 2016; Tajuddin, Tarmizi, Konting, & Ali, 2009). Similarly, the one-group pretest-posttest design was useful in educational settings because it assessed baseline skill knowledge before instruction (Allen, 2017). The posttest-only analysis provided visuals of assessed mean differences between students receiving traditional instruction (control) and READ180 instruction (treatment group). The variability of the mean's spread indicated a difference in scores (Trochim, 2006). A median score for TerraNova was 50% (McGraw-Hill, 2014). Based on the median score the spread indicated how close the READ180 students 'scores were to the average mean score and advanced information regarding READ180's improvement of fourth-grade African American male student reading ability.

A one-group pretest-posttest design provided a difference in Lexile or reading levels. The difference indicated the number of students who participated in the program and experienced an increase in reading ability because of participating in the READ180 program. Participants in the experimental and control groups took the TerraNova, but only the experimental group received reading instruction from READ180 before the assessment. The data used in the study was archived data, time and resource constraints were not a factor.

A qualitative approach was not applied because the results from the TerraNova were presented in numerical formats versus words. Also, I believed before gaining an understanding of why African American male students thought they scored poorly on the TerraNova standardized assessment program effectiveness should be addressed. Additionally, a qualitative approach would be difficult to replicate, as the feasibility of interviewing students did not exist. Likewise, the SRI scores provided numerical data used to indicate READ180's impact on reading ability. Students' beginning year and ending year SRI mean scores were compared to determine the difference in growth. Although the READ180 students started the program with a reading level below 740L, the beginning reading level for fourth-grade, the average annual growth is 140 points (READ 180, Next Generation, 2012).

READ180 was selected as the intervention in this study because the program was the district's core remediation strategy utilized with fourth- through eighth grade struggling readers. Additionally, the program's individualized instruction based on students' profiles showed the programs' resourcefulness. The program consistently

adapted instruction to the learners need. Last, the Sunnyside school system selected the program because it aligned with the districts' reading program and English Language Arts standards.

Methodology

Population

The population of this study was fourth- grade African American male students. A total of 26 students was used in the study. Study participants were located in different elementary schools within the Sunnyside school system located in the southern part of the United States. Although the program serviced a racially diverse population of mixed gendered students; African American male students' reading progress was the objective of this study. African American male students were the focus because they have historically performed lower than their peers on standardized reading assessments (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015). Since the READ180 program was the bridge between underperformance and proficiency in the Sunnyside school system the program's participants were utilized for the study. Students were invited to participate in the READ180 program based on their annual score of less than 25% on the reading section of the 2014 TerraNova assessment. Once students obtained reading proficiency, as measured quarterly SRI tests they were exited from the program.

Sample and Setting

Archival data was drawn from students in READ180 classrooms throughout Sunnyside school system located in the south. The demographics of the students were

identified in the archival data, and that is how I identified my sample from all the other participants. My statistical procedures would be adapted to address the possible circumstance of more or less than 64 participants in the study. A maximum of 15 mix gendered students participated in the program for 45minutes daily. READ180 classrooms are divided into a computer station, an independent station, and a small group station to engage students in targeted reading practices. In contrast, the students who formed the control group received reading instruction in traditional classrooms. The average classroom size was 24 (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015).

The purposive sample size was 26 total participants, seven READ180 participants, and 19 nonREAD180 participants. The READ180 sample was drawn from a population of 225 students. Purposive sampling allowed the use of subjective measures to secure a sample based on the characteristics of the population (Lavrakas, 2008). In this study, the purposive sample was African American male students who scored below 25% on the TerraNova. To participate in READ180 students met the maximum score of 25% on the 2015 TerraNova and had parental permission on file. Teacher recommendation and beginning year SRI score were additional indicators used to consider students for placement in the READ180 program. Students were mainly placed into the READ180 program based on TerraNova scores.

The experimental sample was drawn from READ180 data collection sheets compiled by the school reading specialists in the Sunnyside school system . The control group was drawn from the same schools as the experiment group. Sunnyside school

system's READ180 data contained fourth- grade students gender, race, beginning and ending SRI scores. The district provided TerraNova scores from the 2014-2015 school years for the control and experimental groups in this study. Only African American male students were included in the study. Females participating in READ180 were excluded in addition to students who scored above 25% on the TerraNova.

G* Power 3.1 by Erdfelder, Faul, and Buchner (1996) was used to compute the A priori power analysis for the study. The statistical power analysis was performed to estimate the sample size based on a review of Slavin, Cheung, Groff & Lake's (2008) meta-analysis in which a medium effect size was observed. A threshold probability of $\alpha = .05$ was used to reject the null hypothesis, and a probability of $\beta = 0.8$ was used for Type II errors, and an effect size $d = 0.5$ and a suggested sample size for the study.

Procedures for Recruitment, Participation, and Data Collection

The participating school principals were called to request a meeting to discuss data usage. Participants were then contacted via email to confirm a conference date followed by an in-person meeting with the building principals to request use of archived data for the study. At the meeting with Sunnyside school system administrators, I discussed the purpose of the meeting, which was to assess the influence of READ180 as measured by the TerraNova assessment and the SRI. After Sunnyside school system's principals granted permission to use their school data in the study, the district superintendent was called to arrange a meeting. The initial phone conversation was followed by an email and confirmed the appointment to gain approval to conduct research using school data. Once permission to conduct research was granted by the

superintendent the completed request to conduct research packet with the abstract and methodology portions of my study were submitted to Sunnyside school system's research department for approval.

Archival Data

Archival data were collected electronically after meeting with participating schools. Schools that participated in the study provided testing data containing students, TerraNova reading scores, race, and gender. The archival data was provided after the face to face meeting and Sunnyside school system's approval.

I analyzed archived data from three elementary schools in the same region for the study as the experimental group and the comparison group. SRI scores were collected from schools for the control group. A data file containing students' race, gender, and TerraNova scores were collected from the control group schools. For the experimental group, students' race, gender, TerraNova reading scores and SRI scores were collected on students who participated in the READ180 program during the 2014-2015 school years. Students who scored above 25% on the TerraNova as required for program fidelity were excluded from the study (READ 180, Next Generation, 2012). Also, students who did not have a beginning and ending SRI score were also excluded from the study.

Instrumentation

The TerraNova, third edition standardized assessment was the instrument used in this study. The TerraNova, third edition is a norm-referenced standardized achievement test published in 2011 by California Testing Bureau and McGraw-Hill. Three forms of the assessment are available for use; the Multiple Assessments test version of the

TerraNova was discussed in this study. Results from the assessment provided detailed normative and criterion-referenced scores in the content areas of reading, math, language, science and social studies. The assessment measured students a) basic understanding; b) analysis of text; c) evaluation and extension of meaning; and d) reading and writing strategies to determine reading proficiency. NAEP defined proficient reading as the capability to read and understand grade level materials in accordance with grade-level standards (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015).

The TerraNova assessment provided results in scaled, grade equivalent, national percentiles, national stanine, and normal curve equivalent score formats (McGraw-Hill, 2014). The TerraNova achievement scores compared student performance amongst peers. An objectives performance index was calculated by measuring students' responses to individual objectives (McGraw-Hill, 2014). Each reading objective was measured four or more times in the TerraNova multiple assessments test, and each question was scored on item difficulty and item discrimination (McGraw-Hill, 2014). The objectives performance index was a statistical estimate of the number of points a student is expected to obtain if there had been 100 similar items measuring the objective. (McGraw-Hill, 2014). The objectives performance index scale runs from 0 to 100 and score are typically expressed as two-digit numbers. The individual profile report used three levels to indicate students' level of mastery. A filled circle indicated high mastery, meaning the student had a solid understanding of the skill measured (McGraw-Hill, 2014). A half-filled circle indicated moderate mastery, meaning the student had a reasonable

understanding of the skill measured (McGraw-Hill, 2014). An empty circle indicated low mastery, meaning the student had a minimal or nonexistent understanding of the skill measured (McGraw-Hill, 2014). The moderate and low mastery areas indicated additional support is needed.

Reliability of Terranova's internal consistency was established using the Kuder-Richardson formula, Item response theory pattern and coefficient alphas .80s for survey tests and .90s for multiple assessments (McGraw-Hill, 2008). Content, criterion and construct validity was established through studies, advisory panels, and recommendations from specialists (McGraw-Hill, 2008). The TerraNova was appropriate for this study because it was an achievement test designed to measure students' cognitive reading ability (McGraw-Hill, 2014). Additionally, the assessment used multiple scoring methods, like percentile scores that allowed students to be ranked in a national group of 100 peers. In this study, the normal curve equivalent score was used to standardize all scores. The TerraNova standardized achievement test was previously used to identify predictive relationships between the TerraNova and state assessments. Among them were, Pennsylvania System of School Assessments, Delaware (DSTP) New Jersey Assessment of Skills and Knowledge, Maryland High School Assessment, and District of Columbia Comprehensive Assessment System. Results indicated the TerraNova had the strongest predictability with the Pennsylvania System of School Assessments. Students in fifth, eighth and 11th grade formed the sample. The researchers found adequate to strong predictive relationships between the assessment instruments (Brown & Coughlin, 2007). TerraNova assessments are tested to meet reliability and validity standards.

TerraNova's test-retest with equivalent forms had moderate .67 to strong .82 evidence of stability across grade levels (Brown & Coughlin, 2007). The authors also found small standard errors of measurement and high generalizability coefficients (Brown & Coughlin, 2007).

In this study, the TerraNova test was used as an objective measure of reading ability. The assessment's robust reliability and validity measures supported the applicability of using the assessment to study READ180's influence. The assessments score ranking could be used to monitor learning by indicating scoring patterns. Sunnyside school system's administrators used TerraNova scores for accountability purposes in community strategic plans.

The SRI was the second measure used in this study. The SRI measured students' comprehension of nonfiction text (READ 180, Next Generation, 2012). According to Nilsson (2013), reading inventories provided reliable diagnostic information that could inform instructional practices and decisions. The conclusions were based on a study of the reliability evidence reported in 11 reading inventories. The author noted the scope of reliability evidence included high percentages of interrater reliability in comprehension and alternate-forms reliability in seven of the eleven inventories (Nilsson, 2013). Reliability was applied across grade levels versus within grade levels because of small sample sizes (Nilsson, 2013). A quantitative study conducted by L'Allier (2013) exemplified teachers use of the reading inventory results to make data-driven decisions but cautioned against reading inventories being the only source of data used to make recommendations. The finding was based on the twenty-six teacher participants in the

study varied subjective use of inventory guidelines. Likewise, Manzo and Manzo (2013), touted reading inventories as educational tools with multiple benefits. The authors purported reading inventories, when used as a diagnostic tool has the potential to expose embedded reading needs by identifying students' areas of challenge and mastery (Manzo & Manzo, 2013). Based on the idea of reading inventories being diagnostic tools, Parker et al. (2013) found using reading inventories in conjunction with other reading assessments increased the accuracy of diagnosis. In a study of 900 first and second-grade students, the author discovered that reading inventories had lower accuracy rates for predicating proficiency on standardized assessments compared to assessments of oral reading fluency (Parker et al., 2013). The authors attributed the difference in dependability on poorly developed criteria used to rate the reading inventory. In Sunnyside school systems, the SRI was the only diagnostic tool used to assess reading ability. The district did select a universal oral reading fluency assessment; however, students enrolled in the READ180 program practiced reading fluency in the reading zone of the program.

Operationalization

Reading proficiency was the concept that was measured in this study. Normal curve equivalent scores were collected from the TerraNova. Although the national percentile score was easiest for stakeholders to understand it could not be averaged. In contrast, the normal curve equivalent score could be used to compute differences in scores (McGraw-Hill, 2014). NCE's ranged from 1-99 with 50 being the mean score (McGraw-Hill, 2014). NCEs aligned to NPs at the 1st, 50th, and 99th points (McGraw-Hill,

2014). Scores are obtained by adding the total number of points from the total number of possible points for each item on the TerraNova assessment (McGraw-Hill, 2014). Item response theory was used to construct and calibrate test question. Educators in the Sunnyside school system used the TerraNova standardized assessment results for school accountability and resource allocation. Sunnyside's 2013 accountability plan mandated that no more than 5% of third through eleventh-grade students in each school could score 25% or lower on the TerraNova.

Equally important was the management of reading progress. Teachers in Sunnyside school system used the SRI assessment in two distinct yet interrelated ways to manage reading development. First, SRI was used to measure, monitor, and assess students' growth in reading. Each quarter students attending Sunnyside school system's elementary schools completed an SRI assessment. Although students' Lexile were expected to increase each quarter, the beginning and ending SRI scores were used to measure annual growth. Secondly, SRI scores were used to match students with books they could read independently to emphasize and promote a habit of reading. Reading independence was based on Lexile levels generated by scores from the SRI. Lexile levels aligned to grade levels and ranged from 200 to 1500 Lexile (READ 180, Next Generation, 2012). The Lexile score was based on the difficulty level of the text determined by the Lexile text measure. The Lexile text measure was the number assigned to the text based on the word count, vocabulary, and semantics used in the book (READ 180, Next Generation, 2012). The SRI provided both norm-referenced and criterion-referenced data. The SRI provided norm-referenced data that indicated the

students' current reading skills and knowledge (READ 180, Next Generation, 2012). Also, the results provided criterion-referenced data that indicated the students' reading level; categorized as above, below, or on grade level (READ 180, Next Generation, 2012).

Data Analysis

Data from this study were analyzed using the Statistical Package for Social Sciences (SPSS) version 25 statistical package. SPSS is an interactive software package that provides statistical analysis, modeling, predictive, and survey research tools (Green & Salkind, 2014). The data view window or editor allowed users to enter data into SPSS (Green & Salkind, 2014). The variable view allowed users to define the parameters for the data entered SPSS (Green & Salkind, 2014). SPSS has 14 different menus that allowed users to conduct numerous options (Green & Salkind, 2014). The file menu was used to create, open, and save files in addition to exiting SPSS (Green & Salkind, 2014). The edit menu allowed copying and pasting data within files whereas the view menu is where changes to the desktop were made (Green & Salkind, 2014). The transform menu allowed users to replace missing values whereas the graphs menu was used to create graphs (Green & Salkind, 2014). Lastly, the analyze menu allowed users to conduct a myriad of statistical analysis (Green & Salkind, 2014).

The TerraNova and SRI data were perused for completeness. After visual inspection, an automatic system-missing values check was conducted by SPSS. Two related research questions guided this study. The first asked: What is the difference between fourth- grade African American male students' TerraNova reading scores after

participating in the READ180 program compared to those who did not participate in the READ180 program? The second research question asked: What is READ180's influence on fourth- grade African American male students reading ability as measured by the beginning and ending academic year SRI scores?

The null hypotheses stated: Participating in the READ180 program had no statistically significant difference in fourth- grade African American male students' TerraNova reading scores. Participating in the READ180 program has no statistically significant effect in fourth- grade African American male students' SRI scores. In contrast, the alternative hypotheses stated: Participating in the READ180 program had a statistically significant difference in fourth- grade African American male students' TerraNova reading scores. Participating in the READ180 program has statistically significant effects on fourth- grade African American male students' SRI scores.

An independent samples *t*-test was used to detect statistical differences between the TerraNova reading means of READ180 and nonREAD180 students. Independent-samples *t*- test "evaluate the difference between two unrelated groups; each group has a categorizing variable and test variable" (Green & Salkind, 2014, p.156). Levene's test for equality of variance evaluated the assumption that the population variances of the two groups were equal with a 95% confidence interval. The size of the *p*-value indicated variance. A large *p* -value *(p* .05) indicated the variances were equal, and a small *p*-value ($p < .05$) indicated unequal variance. The null hypothesis was rejected if the variance <.05 and it was concluded that the TerraNova scores of fourth- grade African American male students that participated in READ180 were significantly different from the fourth-

grade African American male students who did not participate in the READ180 program. A paired *t*-test was used to measure differences between students' beginning and ending academic year SRI scores. Outliers were deleted from the data after ensuring the analysis was correctly conducted and all the information accurately inputted.

Threats to Validity

In-school tutoring could be a threat to validity in this research. Throughout Sunnyside school system's, teachers provided tutoring in reading 3 days a week. The tutoring sessions were available to anyone in the experimental or control group to participate and for any amount of time. As students who scored in the lowest testing quartile were used in the study, experimenter effects may have occurred as the READ180 teacher modeled and reinforced academically correct behaviors. Pre-study grouping imbalances and drop-out were listed by Campbell and Stanley (1963) as additional threats to the nonrandomization of the posttest design. Also, maturation could be an internal threat to both study groups as students started school in August and were not assessed until six months later in which they would have matured. Also, the region had a relatively high relocation rate; mortality may be another limitation in the study. Relocation may reduce the sample size because only students with beginning and ending SRI scores were used in the study.

Ethical Procedures

This study was conducted in acquiescence with all policies and procedures required by the Sunnyside school system and Walden University for conducting archived data analysis. According to Walden University requirements, all researchers must

receive approval from the institutional review board 08-15-18-0407774 to collect data (Walden University, 2009). I participated in Walden's IRB chat sessions to receive guidance on ethical inquiry regarding community cooperation for the feasibility of my study. Sunnyside school system required a copy of IRB proposal approval in addition to a request to conduct research packet seeking permission to conduct research involving Sunnyside school system. All identifying information that could identify participants beyond gender and race were removed before collection. All information was collected on a password protected flash drive that only I have the password. The flash drive was secured in a locked file cabinet. The material will remain protected until it is destroyed. After this study has been conducted and the research has been approved the data will be destroyed five years later in accordance with Sunnyside school system's policy.

Summary

In conclusion, the methodology that was used to investigate the effectiveness of the READ180 program for improving fourth- grade African American male students' reading skills is outlined in Chapter 3. The quasi-experimental approach used a nonequivalent posttest only design and a one-group pretest-posttest design. An independent samples *t*-test was used to detect statistical differences between the TerraNova reading means of READ180 and nonREAD180 students. A paired *t*-test was used to compare the beginning year and ending academic year SRI scores. In chapter 4, I provide the results of the study.

Chapter 4: Results

Introduction

The purpose of this quantitative ex post facto study was to examine the effects of fourth-grade African American male students TerraNova scores and SRI scores after participation in the READ180 program. The independent variable was the READ180 program. The dependent variables were the 2014-15 school year TerraNova reading NCE scores and beginning and ending academic year SRI scores. The study was designed to assess READ180's influence on reading through formative and summative assessments related to the program. The goal of this quantitative study was to fill a gap in the research literature on non-commercial reading interventions effectiveness with fourth-grade African American males.

Research Questions and Hypotheses

Research Question 1: What is the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the READ180 program?

$H_0$1: Participating in the READ180 program has no statistically significant difference in fourth-grade African American male students' TerraNova reading scores.

H_a1: Participating in the READ180 program has a statistically significant difference in fourth-grade African American male students' TerraNova reading scores.

Research Question 2: What is READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores?

$H_0$2: Participating in the READ180 program has no statistically significant effect on fourth-grade students' SRI scores.

H_a2: Participating in the READ180 program has a statistically significant effect on grade four students' SRI scores.

Chapter 4 begins with an introduction to the study in which the research questions and hypotheses are discussed. The next section, data collection, outlines the timelines, recruitment activities, and data collection plans follow in the study. A description of the sample concludes this section. Descriptive statistics of measures of central tendency and measures of dispersion in addition to *t*-test inferential statistics are discussed and illustrated in the subsequent results portion of the study. Effect size and study assumptions are also included in the results portion of the study. A summary of the findings in answer to the research questions concludes the chapter and transitions into Chapter 5.

Data Collection

Timeframe and Recruitment

After receiving approval from Walden's Institutional Review Board on August 15, 2018, followed by approval from Sunnyside school system's Human Research Protection Program on February 4, 2019, archived TerraNova and SRI data for fourth-grade African American male students were collected. From February 4- March 1, 2019

data for the experimental group and control group were collected from three elementary schools in the Sunnyside school system.

Per Sunnyside school system's research policy, school principals must agree to release data before permission was granted to conduct research. I contacted each principal from five elementary schools within Sunnyside school system for an appointment. At the in-person conference, administrators were asked for permission to use their school's 2015 TerraNova and SRI data for READ180 students in my research. Two principals in Sunnyside's school system declined to release their school data reducing the number of students the experimental sample size. There were no inconsistencies in the data collection design presented in Chapter 3.

Baseline Demographics

All 26 students who participated in the study were fourth-grade African American males from three schools within Sunnyside school system. The reduced school participation reduced the sample size. The experimental group was comprised of READ180 students assigned to the program based on the 2014 TerraNova standardized assessment. Correspondingly, the participants had a below grade level beginning academic year SRI score. The control group was comprised of 19 traditional fourth-grade African American male students who received traditional reading instruction.

The sampling size, illustrated in Table 4, was determined by G* power 3.1 analysis in which a large effect size of .08 was employed. The effect size was redetermined by G*Power Post hoc to account for a reduced sample size. A statistical power analysis was performed for effect size. The sample size, error probability, group

means, and stand deviations were entered, and the *N* of 26 required an .8 effect size with *p*-values using a *t*-test. Researchers in previous studies used a large effect size to explore the influence of computer-based instruction (Bailey, Arciuli, & Stancliffe, 2017; Hall, & Burns, 2018; Felix, Mena, Ostos, & Maestre, 2017). A purposive sampling strategy was used for this study. According to Creswell (2009), researchers used purposive sampling to produce a sample representative of the population. Historical data from three of five elementary schools located in the southern part of the United States were analyzed in this study. All students received the same assessments on the same day during the scheduled testing window provided by the district.

Results

My data analysis plan required the use of an independent *t*-test and a paired *t*-test to test my hypotheses. TerraNova scores from 26 participants were examined to address research question one. Descriptive statistics in Table 4 showed 76% of the participants were non-READ180 students compared to 24% of READ180 students. The discrepancy between the suggested sample size and the actual sample used in the study was the result of small populations of fourth-grade students in general and African American males specifically in the participating schools. According to READ 180, Next Generation (2012), READ180 was designed to remediate three groups of 15 students which suggested a minimum of 45 students per school year. Participating schools provided data with minimal student participation in READ180. The TerraNova and READ180 data used in this study were verified with individual schools and Sunnyside school system's

testing and accountability department. There were no discrepancies in the data collection plan presented in Chapter 3.

A difference of 10 points existed between Sunnyside school system's fourth-grade African American male students participating in READ180 and Sunnyside school system's fourth-grade African American male students who did not participate in READ180 TerraNova reading means. The end values were correct, and there were no missing values. The data scores were independent of each other meeting the assumption of independence.

Table 4

TerraNova Reading Scores Group Statistics

Intervention	N	Mean	Std. Deviation	Std. Error Mean
READ180	7	41.8571	9.11827	3.44638
Non-READ180	19	51.8947	13.98767	3.20899

Research Question 1

What is the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to the control group which did not participate in the READ180 program?

An independent *t*-test at the significance level of $\alpha = 0.05$ and a confidence level of 95% was conducted to test the null hypothesis that the reading means from the two groups were equal. READ180 was the grouping variable that divided the sample means.

Descriptive statistics and Q-Q plots were analyzed to understand the statistical observations.

The Shapiro-Wilks test shown in Table 5 was used to test the assumption of normality. The test assessed if the distribution of TerraNova scores were statistically different from the normal distribution. From the Shapiro-Wilks test, the *p*-value was compared to the a priori alpha level, and a determination was made to retain the null hypothesis $p = .568$. The assumption of normality was met for the sample. Shapiro-Wilks was used because the sample total was less than 2000 (Green & Salkind, 2014).

Table 5

TerraNova reading scores: Tests of Normality

Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Statistic	*df*	Sig.	Statistic	*df*	Sig.
.122	26	.200*	.968	26	.568

Note .The asterisk means a lower bound of the true significance.
a. Lilliefors Significance Correction

The output from the Levene's test for equality of variances indicated a test statistic of F 2.384, $p = .136$. A comparison of the *p*-value to .05 showed there was no evidence to reject the null hypothesis. This indicated an assumption that the variance between the control and experimental groups were not significantly different and the assumption of homogeneity of variance was met. Results of the independent samples *t*-test were presented in Table 6.

Table 6

Levene's Test of Equality

				t-test for Equality of Means					
								95% Confidence Interval Difference	
		F	Sig.	t	*df*	Sig. (2 tailed)	Mean Difference	Lower	Upper
TerraNova reading scores	Equal variances assumed	2.384	136	-1.754	24	.092	-10.03759	-21.84873	1.77354

READ180 students (*M* = 41.8571, *SD* = 9.11827) and students not in READ180 (M = 51.8947, SD = 13.98767) conditions *t* (24) = -1.754, *p* =.092 at α = .05 level of significance suggested evidence to accept the null hypothesis. There was no evidence of a significant difference between the READ180 and non-READ180 African American fourth-grade males TerraNova reading scores. Cohen's *d* effect size .850 was not provided by SPSS. The effect size was determined by dividing the mean difference by the pooled standard deviation using the statistics calculator at www.socscistatistics.com/effectsize. After entering the mean and standard deviation for each group the calculator computed a large effect size *d*. Examining the confidence interval, the lower limit -21.84 and the

upper limit 1.7 contained zero; therefore, the null hypothesis was accepted. As a result of working with two independent groups, one *df* was lost for the mean of each group (Green & Salkind, 2014).

Research Question 2

What is READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores? Table 7 descriptive statistics showed READ180 students read at a higher reading level on the end of year SRI test (M = 616.4286, SD 130.58) compared to the beginning year SRI test (M = 497.28, SD = 81.50). In addition, the statistics indicated a higher mean score on the 2015 TerraNova test (M = 43.60, SD = 9.81) compared to the previous year TerraNova test (M = 39.2, SD =7.19). The cases were samples of matched data from the READ180 population of fourth-grade African American male students. Prior to analysis, the *t*-test assumptions were assessed. The dependent variable was continuous data measured at the interval scale meeting the assumption of the *t*-test. Also, the subjects in each sample were the same, meeting the second assumption of paired scores.

Table 7

Beginning and Ending SRI Paired Samples

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Score before READ180	497.2857	7	81.50811	30.80717
	Score after READ180	616.4286	7	130.58951	49.35819
Pair 2	Current year test	43.6000	5	9.81326	4.38862
	Previous Year Test	39.2000	5	7.19027	3.21559

The difference between READ180 students beginning and ending mean scores was tested for normality using the Shapiro-Wilk test shown in table 8. The Shapiro-Wilk test indicated evidence to retain the null hypothesis. Evidence that data was normally

distributed was based on the output of READ180 SRI *p*-value which was .358 and greater than the chosen alpha level of .05; meaning the differences between the dependent variables were normally distributed-meeting the assumption of normality.

Table 8

Beginning and Ending SRI Scores

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*Df*	Sig.	Statistic	*Df*	Sig.
Score before READ180	.233	7	.200*	.911	7	.406
Score after READ180	.231	7	.200*	.904	7	.358

In addition to the Shapiro-Wilk test of normality, Figure 1 graphical data illustrated that all the data points were fairly close to the line in Normal Q-Q plots of difference which indicated normally distributed data. Visual inspection of the Q-Q plots showed one outlier in the scores; however, skewness or kurtosis was not detected. To ensure normality, *z*-values for skewness and kurtosis were calculated by dividing the statistic by the standard error. The results from the students' end of year SRI scores indicated a skewness of 1.27 (*SE* = .794) and kurtosis of 1.25 (*SE* = 1.587) both were within the -1.96 and + 1.96 range of normality (Shapiro & Wilk, 1965). After testing the *t*-test assumptions, a paired samples *t*-test was used to determine if the beginning year SRI scores were significantly different from the end of year SRI scores.

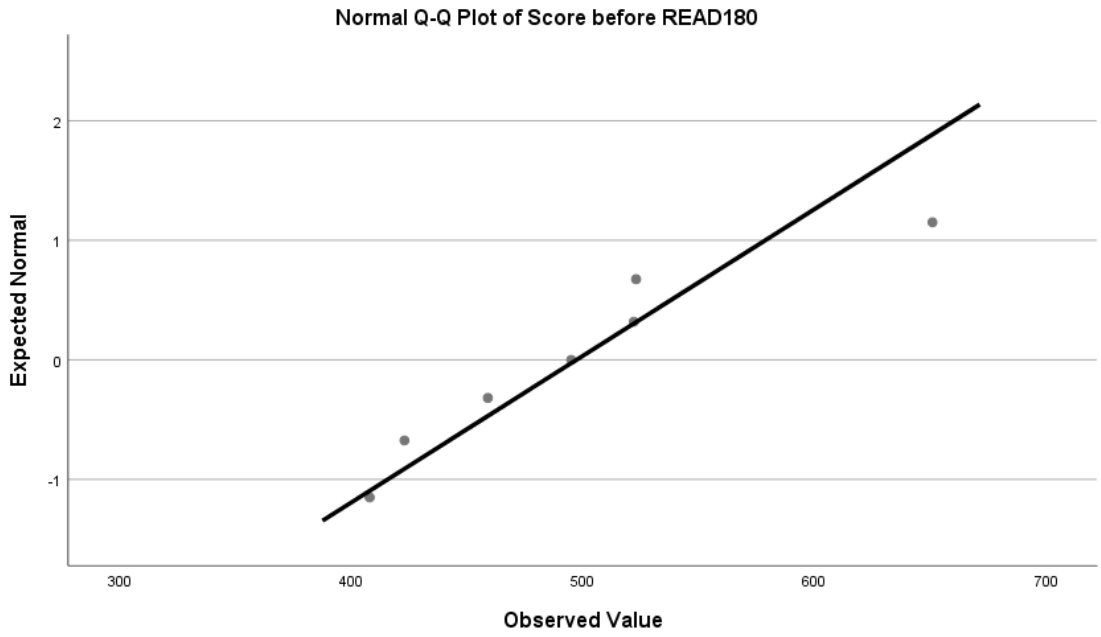

Figure 1. Normal Q-Q plot showing differences between groups' posttest scores normally distributed

Table 9

READ180 SRI Means

		Paired Samples					
		Mean	Std. Deviation	Std. Error Mean	*t*	*df*	2-tailed
Pair 1	Score before READ180 Score after READ180	-119.1428	83.97108	31.73809	-3.754	6	.009
Pair 2	Current year Standardized test - Previous Year Test	4.40000	10.76104	4.81248	.914	4	.412

To determine whether the paired samples *t*-test of the READ180 students SRI scores were significant, the data in Table 9 was examined. The mean difference between the two variables was -119.1428 with t (6) = -3.7574, p .009 < .05. I rejected the null hypothesis that the mean difference was equal to 0 at the .05 level. The alternative hypothesis was accepted. With 95% confidence, the mean difference in fourth-grade African American male students SRI scores from the beginning of the year to the end of the year was between -196.80316 and -41.5327. The null value of the confidence interval for the mean was zero. The difference in reading ability means did not include zero. Post-hoc analyses were not applicable because the study did not involve more than two groups.

Summary

The purpose of this quasi-experimental study of historical data was to examine the effects of fourth-grade African American male students TerraNova scores and SRI scores after participation in the READ180 program. The READ180 program is a computer-based program implemented as a Tier 2 reading intervention. To measure the program's effectiveness, I conducted an independent *t*- test analysis of TerraNova scores and a paired *t*-test analysis of SRI scores that provided statistical evidence to the following research questions. Research question one: What is the difference between fourth-grade African American male students' TerraNova reading scores after participating in the READ180 program compared to those who did not participate in the READ180 program? Research question two: What is READ180's influence on fourth-grade African American

male students' reading ability as measured by the beginning and ending academic year SRI scores?

Results from the independent *t*-test READ180 students (M = 41.8571, SD = 9.11827) and students not in READ180 (M = 51.8947, *SD* = 13.98767) conditions *t* (24) = -1.754, *p* =.092 indicated at the α = .05 level of significance, there was enough evidence to support my hypothesis that participating in the READ180 program had a statistically significant effect on fourth-grade African American male students' TerraNova scores. The results indicated an assumption that the variances between the two groups were equal. There was no significant difference in the TerraNova reading scores.

The paired *t*-test results were found to be significant, (*t* (6) = -3.7574, *p* .009 < .05). This analysis supported the findings that indicated there were significant improvements in the fourth-grade African American male READ180 students' reading ability which led to the rejection of the null hypothesis that stated that there was no significant effect. I rejected the null hypothesis that the mean difference was equal to 0 at the .05 level. The alternative hypothesis was accepted. Indicating the mean difference of -119.14286 between the beginning and ending SRI scores did not occur by chance.

The sample size used in this study was smaller than the power analysis projected sample size requirement. When principals from the two largest schools in the district declined to participate in the study; the remaining schools' smaller population may be a plausible cause for the reduced sample size. The principals' decision limited the number of student data accessible as Sunnyside school system's accountability division would

only release approved data from schools that principals had granted permission. Also, an inability to compare the READ180 teacher's record of student participation with the district's master record may have influenced the size of the dataset. Post hoc analysis was conducted to align the actual sample size and the effect size.

Consequently, the small sample size restricted the studies' generalizability and caused narrowed applicability of findings to fourth-grade African American male students in the Sunnyside school system. External validity was reduced as a consequence of limited population generalizability and mortality. Mortality was defined as the loss of participants from the study (Campbell & Stanley, 1963).

The goal of conducting the study was to fill a gap in knowledge by identifying READ180's effectiveness as a Tier 2 reading intervention for improving fourth-grade African American male students' reading ability. Possible reasons for READ180's significant influence on reading is discussed and analyzed in Chapter 5. Also, the discussion in Chapter 5 includes the interpretation of findings, the limitations of the study, recommendations for future research, implications and conclusions of the current research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative ex post facto study was to examine the effects of fourth-grade African American male students' reading ability after participation in the READ180 program. Also, the study was used to explore READ180's influence on fourth-grade African American male students reading ability as measured by the beginning and ending academic year SRI scores. There was a need for this study because there was limited noncommercial research on READ180 as a Tier 2 intervention. Moreover, previous research did not examine the program's effect on the reading ability of fourth-grade African American male students. Reading interventions at the upper elementary level are pivotal points for remediating reading difficulties (Rasinski et al., 2017; Stevens et al., 2016).

The results of this quasi-experimental study showed READ180 was a valid Tier 2 intervention for fourth-grade African American male students scoring 25% or in the fourth- quartile on standardized assessments. Furthermore, the nonequivalent posttest study findings provided evidence that students' scores on the reading portion of the TerraNova standardized assessment increased significantly after participating in the READ180 program. Also, the study results showed significant increases in students' end of year reading ability compared to their beginning year abilities. In conclusion, all key findings from the ex post facto study indicated the majority of fourth-grade African American male students, in the experimental group who participated in the READ180 program, experienced significant, positive growth in overall reading ability as indicated

by increases in formative and summative reading assessment scores. The students' positive results were attributed to READ180' s consistent scaffolding within the student's ZPD.

Interpretation of the Findings

The affirming answers to the research questions confirmed and aligned with research discussed in Chapter 2 supporting the practice of identifying and remediating struggling readers according to RtI, Tier 2, guidelines (Toste et al., 2014; Wanzek et al., 2013). Likewise, the results from this study confirmed research that suggested computer-based scaffolding produced significate educational gains by creating greater comprehension in the learning process (Belland et al., 2016). Elementary students' cognitive development and cognitive outcomes improved when teachers in educational settings consistently provided scaffold instruction (Belland et al., 2016; van de Pol & Elbers, 2013). The READ180 program consistently provided students scaffold reading instruction based on their assessed reading levels. Scaffolding was applied within acceptable tolerance ranges to avoid feelings of reduced self-efficacy, motivation, learning, or frustration (González-Calero et al., 2015). The discoveries provided positive support for the continued use of scaffolding reading instruction within students' ZPD as a strategy to improve reading comprehension (Belland et al., 2016; van de Pol & Elbers, 2013; Vygotsky, 1962).

Equally important, the findings from the study supported the use of interactive computer programs to successfully provide students with differentiated instruction at their correct level of learning (Denton et al., 2014; Ma et al., 2014). This conclusion was

parallel with research signifying systematic computer-based instruction had positive educational outcomes for struggling readers when based on ability versus grade level content (Belland et al., 2016; Ponce et al., 2013). READ180's consistent leveled instructional practices with constant feedback led to student growth and aligned with Ma et al. (2014) finding that learning systems produced reading gains commonly associated with small group instruction. READ180's direct instruction was embedded in differentiated instruction. The strategic instruction provided students with rich learning opportunities to understand and practice reading strategies while expending declarative knowledge (Droop et al., 2016; Goddard et al., 2015). Differentiation commonly applied in educational settings balanced differences in learning as a result of differences in ability, exposure, or culture (Puzio et al., 2015).

In addition to differentiation, student success was attributed to the subject matter, duration of instruction, and engagement of the learning system (Steenbergen-Hu & Cooper, 2013). Another benefit of remediating fourth-grade African American male students with the READ180 reading program was the elimination of teacher expectations. Students practiced skills and listened to directions, reminders, and tips, as frequently as desired without judgment. Students' perceived inability to meet teacher expectations was noted as a universal source of a conflictual teacher-student relationship, lowered reading achievement, and reduced academic achievement (Gershenson et al., 2016; Hajovsky et al., 2017; McCormick & O'Connor, 2015; Kumar et al., 2015; Ratcliff et al., 2017)

Last, the findings from the research supported explicit reading instruction as an approach that enriched differentiation and enhanced learning as stated in previous

research (Callahan et al., 2015; Firmender et al., 2013; Puzio et al., 2015). The READ180 program engaged students metacognitively using a dashboard of icons that indicated the students' level of skills mastery in preparation for direct instruction. Although the READ180 program assessed students' academic strengths and weakness the program did not include a measurement of learning styles. The program did not include instruction based on the students' preferred learning styles which when joined with direct instruction and differentiation increased teaching effectiveness (Robb, 2013). All students received the same instructional approach. READ180 used explicit instruction to move students along the learning continuum towards reading mastery.

Explicit instruction required student understanding of demonstrated learning, and targeted feedback before student practice to promote meaningful learning and skill attainment that builds in complexity (Denton et al., 2014), The results from this study differed with Ritchey et al., (2017) findings which indicated that explicit instruction heightened skill mastery but limited transference of learning and increases in reading comprehension. In contrast, this study's findings suggested tutoring systems explicit instruction led to expansions in students' general knowledge, skill mastery, and reading comprehension (Lenhard's et al., 2013). In this study, the skills that the students learned were adequately transferred from isolated practice, to in context preparation, and finally, skill transference as indicated by the students' TerraNova reading scores.

This study's results contributed to the educational field by providing updated quantifiable data on READ180's influence as a Tier 2 reading intervention for fourth-grade African American male students. Previous studies documented the program's

influence on middle school students' formative or summative assessments with a focus on differentiation (Fogarty's et al., 2017; Scammacca et al., 2015). Research in this study used Vygotsky's theory of cognitive development with a concentration on students' ZPD to assess READ180's influence on both formative and summative assessments. The broadest application of a more knowledgeable other was utilized enabling the examination of READ180's role as the more knowledgeable other with racially homogeneous groups in 21st century educational settings. Research indicated that quality teachers were essential for improving African American male students' reading outcomes (Caughlan & Jiang, 2014; Curry, 2014; Goldhaber et al., 2015; Yeh, 2017).

In contrast to previous studies that assessed READ180 effectiveness by examining heterogenous groupings, the current study unambiguously investigated homogeneous fourth-grade African American male student groupings (Cheung, & Slavin, 2013; Fuchs & Fuchs, 2017; Kim et al., 2010). Additionally, the results of the study contributed to the general improvement of education by identifying a practical, effective, and efficient intervention to use with a perceptible population within the all-encompassing struggling reader classification. Research has consistently indicated that differentiated instruction bridged achievement and promoted student equity (Valiandes, 2015). The difference between fourth-grade African American male students beginning and ending year SRI scores attested to early detection and remediation increased chances of catching up with peers (Scammacca et al., 2015). Students were referred to the program based on standardized test results from third grade. Additionally, previous research findings indicated that student accountability increased when engagement

increased (Snow et al., 2014). The READ180 program used interactive zones based on student interest to teach students foundational reading skills. Understanding READ180's influence was vital in determining if Sunnyside school system's systemic implementation of READ180 a) supported the ESSA designed to ensure learning for all students and b) had the potential to accelerate fourth-grade African American male students' proficiency in grade level standards-halting the historical trend of underperformance in reading (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015).

Limitations of the Study

A small sample size of African American male students was the chief limitation to the generalizability of this study. According to power analysis conducted before the study, N = 128 was the suggested sample size for my study; however, N = 26 was the actual sample size used in the study. Therefore, the results may only be representative of fourth-grade African American male students in READ180 or a similar population. This limitation is an important consideration because larger samples more closely approximate the population. Also, a small sample may not convey the importance of aligning populations with tools and resources based on evidence and not economic expediency. The quantitative design used in the study posed an additional limitation of unequal groups. The nonequivalent group design lacked randomization in favor of intact groups which limited the confidence of the group's equality (Campbell & Stanley, 1963). In this study, a purposive sample of READ180 students formed the experimental group. Another factor that may affect generalizability was the connection between the beginning

year and end year assessment. The results might have been different if girls were included in the study because girls tend to read at higher levels than boys (U. S. Department of Education, Institute of Education Sciences, National Center of Education Statistics, 2015).

Recommendations

The study findings raised several suggestions that could strengthen school districts' selection and implementation of READ180 as a Tier 2 reading intervention. This study was conducted to assess READ180's influence on African American male students from a quantitative approach; however, future research could deploy a mixed methods design. Utilizing a mixed methods design would allow the researcher to analyze numerical data in addition to students' interpretations of the program's influence. As a result of a mixed methods approach researchers could determine if skills transferred from the READ180 setting to the classroom setting. Also, data could be gathered on which setting (READ180 or traditional) students believed improved their reading ability. Additionally, the mixed methods designed would allow researchers to assess program fidelity based on multiple fluid indicators such as weekly participation, teachers and students' perception and opinion of the READ180 program. This information could reinforce the importance of giving students systematic, meaningful remediation coupled with exposure to grade level content.

Implications

With a plethora of commercial reading programs available for purchase, implementing a practical Tier 2 reading intervention remains a ubiquitous challenge for

school systems (U. S. Department of Education, Institute of Education Sciences, What Works Clearing House, 2016). The results of this study indicated that approaching the problem of implementing a reading intervention that was effective with fourth-grade African American male students scoring below 25% on standardized assessments from a quantitative approach was beneficial to assessing learning outcomes. After examining READ180's influence as a Tier 2 intervention, several interlaced implications of social change at the individual and organizational levels emerged.

Implications for positive social change at the individual level could perhaps inform teachers that remedial programs like READ180 were designed to work in conjunction with students' core education programs. With increased accountability teachers are required to cover more rigorous curricular content without additional time or support. Often to meet the demands of differentiation teachers rely on remedial programs to provide reading instruction thereby hindering students' exposure to grade level curricula after returning to the classroom form pullout services. Intentional teaching was another implication concerning educators. Teachers must create instructional practices that build background knowledge in clear and specific ways guided by student need instead of curricular content.

Also, at the individual level, the results of this study may inform building administrators of the value monitoring the alignment between reading interventions and homogeneous school populations. The ESSA requires schools to meet the needs of homogeneous student populations as well as heterogeneous populations. At the organizational level, it seems that RtI reading programs such as READ180 could become

part of a systemic screening process designed to assist school systems in providing educational services. Additionally, schools must conduct and maintain accurate record keeping to better understand the program's influence.

Conclusion

The conclusions of this study supported the contributions made by previous studies that examined the influence of READ180, scaffolding, RtI, the zone of proximal development, computer-assisted instruction, differentiation instruction, and reading instruction. The study provided a format for evaluating READ180's practicality and influence as a Tier 2 reading intervention. Placed in the context of the cognitive theory the difference between READ180 participants beginning and ending academic year SRI scores indicated that previously underprepared students could attain marked skill mastery when provided differentiated, direct instruction continuously. This study provided evidence to educational stakeholders of the importance of Tier 2 interventions.

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